Blü-Test Wireless Test Instruments

Operations Manual & User Guide

Gauge

Graph

Open tip for measuring temperature and humidity

Sealed piercing tip

Sealed probe tip can be used in liquids

OLED displays measurements and cycles through other displays: battery, level, log indicator, etc.

Reversible belt clip

Adjustable rubber duct cone allows hands-free measuring in ducts

Magnetic side panels for secure mounting on metal

| Low Pressure | Standard Pressure | Piercing Temperature | 6 inch Temperature | Temperature / Humidity | 9.5 inch Temperature |

Communicates via Bluetooth with your Android™ or iOS Smart Phone or Tablet

Temperature, Humidity and Differential Pressure Sensors

Rechargeable Lithium-Ion Battery via Micro-USB

Connect Up to 6 Probes at a Time

OLED on the Probe Displays Readings

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Table of Contents

Sect. 1: Overview and Identification

Blü-Test is a suite of handheld testing probes that communicate via Bluetooth 4.2 up to 30 feet to the user's enabled Android or iOS Smart Phone or Tablet. Each probe comes with a National Institute of Standards and Technology (NIST) traceable certificate of calibration.

Blü-Test is very simple to use. Start the app on your smart phone or tablet and select the probe to view live data from that device. Multiple points can be logged, graphed or emailed. The logs are saved on the probe and the app and can be emailed to your account for use in commissioning, troubleshooting or comparing against the BAS. Measurements are also shown on the handheld probe's local display for convenience.

Blü-Test can take readings and store the data in its internal memory when the smart phone or tablet is out of range. The data is then uploaded to the App when the phone or tablet is back in range.

Fig. 1: Blü-Test Suite of Sensors
(Units on the right are shown with the included duct cone for hands-free measuring in ducts.)

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2 of 12

Sect. 2: Loading App and Connecting to a Probe

Blü-Test App (Phone or Tablet Display):

The Blü-Test App must be loaded on your Android or iOS Smart Phone or Tablet to communicate with the probe. The App requires a minimum operating system of Android OS 4.4 (KitKat) or higher and Apple iOS 9 or higher.

Loading the Blü-Test App:

1. Access the Google Play Store or Apple's App Store on your internet enabled phone or tablet.
2. Search for "Blu-Test" (Do not use the "ü" symbol in your search).
3. Tap the Blü-Test Application icon (Fig. 2) and select "Install" to download to your device.

Connecting to a Probe:

Turn on the Probe by pressing and holding the button and then open the Blü-Test App. Probe(s) will connect automatically and be shown on the Devices Screen (center menu icon). If Bluetooth on your device is turned off, the app will ask if you want to turn it on. The units that show Bluetooth or connection signal strength via the white icons on the left are currently active. (Fig. 3) is the devices screen with active probes. Pressing ">More" will display the total number of inactive probes which the App has communicated with in the past.

Fig. 2: Blü-Test Application Icon (above) and Initial Screen (right)
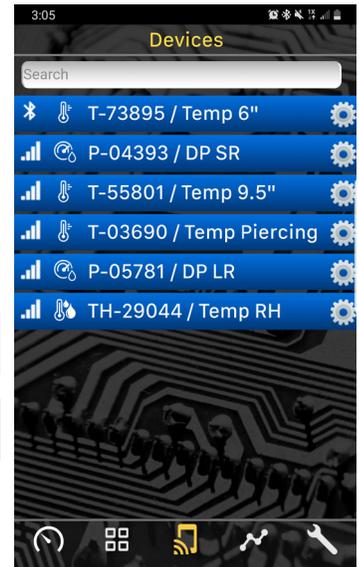
Fig. 3: Devices Screen showing multiple Blü-Test probes.

Sect. 3: Probe Information

The probe has a rechargable battery and will NOT be fully charged upon arrival. BAPI recommends that you recharge the battery with the supplied USB cable prior to using the probe.

Button Press	Functionality
Press and hold.............	Press and hold for 2 seconds to turn unit off.
One button press.........	Turns unit on if it is off; wakes the unit if it is asleep. If the unit is on and awake, it cycles between: Display Type (°C/°F on temp units) (%RH/°C/°F on temp/humidity units) (WC/Pascals on pressure units), Probe Firmware Version, Sensor Type, Probe ID, Probe Application ID, Battery Charge Level in %, and Probe Part Number.
Two button presses	Toggle logging of readings on/off. The word "LOG" is shown on the probe display next to the battery icon when the probe is logging data.
Three button presses...	Autozero for pressure units only

Additional Info

Battery Indicator	Level of charge. Up to 10 days of continuous logging on a single charge.
Sleep Mode	The screen will go blank after two minutes of no activity.
Sensing Detail	Measurements are taken and updated to the App as selected in the App.
Auto-Off	After 15 minutes of no activity (no logging, no active app present).
On Probe Log Storage..	Probe is capable of storing up to 300 hours of log data on board. Probe manages memory by removing log files in a first in/first out method.

Fig. 4: Blü-Test Probes

Battery Charging

The probe has a rechargeable battery and requires periodic charging with the supplied USB cable that plugs into the charging port on the back of the unit. The battery icon on the display will indicate that the unit is charging. The probe is shipped not fully charged.

Contains FCC ID: 2AA9B04

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
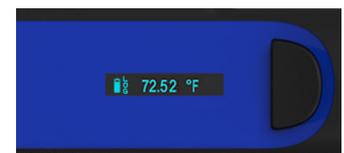

Fig. 5: Closeup of the Blü-Test Probe OLED display

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3 of 12

Section 4: Devices Screen Overview - Blü-Test Application

Navigate to the Devices screen by tapping on the Devices Icon (center icon) in the main menu at the bottom. This screen shows all probes which the App is communicating with. The Bluetooth or signal strength icon will be white for probes that are currently communicating with the App. You can touch ">More" to show all probes that have communicated with the smart device. You can then touch "<Less" to collapse the list to currently communicating devices. For best performance, monitor six or less Blü-Test probes at one time with the App.

Name a Probe
Tap on the gear icon to the right of a probe bar (Fig. 6) to open the Probe Settings pop-up window (Fig. 7). Add the desired name in the Probe name field. Press OK to save the new name.

Identify a Probe
In the same Probe Settings pop-up window as described above, pressing the "Identify" button will cause the probe name to be shown for a short period on the probe display. This lets you identify a specific probe when communicating with multiple probes.

View Graphs of Logs and Live Data for a Probe
Tap on a probe bar to expand that bar and view the historical log files of that probe as well as the live data option (Fig. 8). Tap on a log bar or live data and a check mark will appear in the box. Tap on the Graph Icon (2nd from right in the main menu) to open the Graphs screen (Fig. 9) which shows historical graphs of all logs with check marks. Multiple logs can be selected and viewed at once; however, the best practice is to choose log files that are chronologically close to each other. Large breaks in time between logs makes the graph difficult to view.

Warning - It should be noted that creating logs from live data is not as reliable as initiating a log from the probe. Losses of data can result when a notification is received on your smart device, the Blü-Test application is minimized, or a probe is powered down.

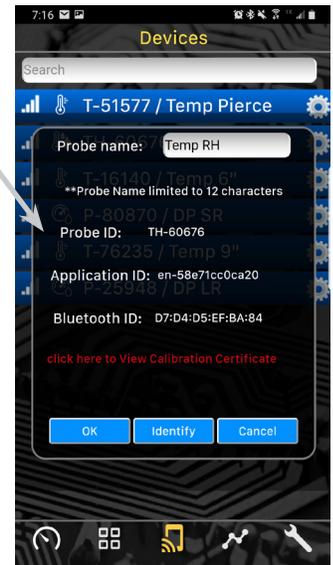**Fig. 6:** Devices screen showing 3 Blü-Test probes.

Fig. 7: Probe Settings pop-up window.

Fig. 8: Devices screen with live data selected.

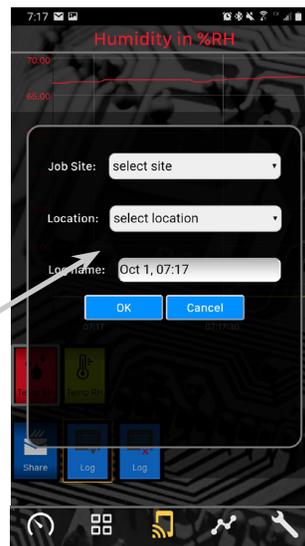**Fig. 9:** Graph screen showing the live data.
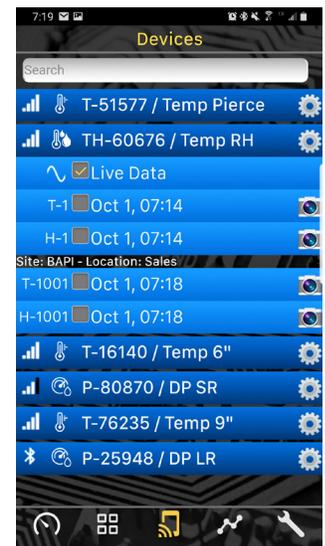

Fig. 10: Log Name screen.

Fig. 11: Devices screen with the new logs.

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4 of 12

Section 4: Devices Screen Overview continued...

Continued from previous page...

Creating Log Files

There are two methods for creating and storing a log file. The first method is to store live data as it is being graphed, and the second is to initiate a log via the probe.

Create Log Button

Creating a Log File from a Graph

Select the live data for the probe that you would like to log. Go to the Graphs screen to view the live data, then press the "Create Log" button to open the Log Name screen (Fig. 10) where you can give the log a name and associate it with a job site and location.

Fig. 12: Probe display showing the log function on

Creating a Log File via the Probe

Turn on the probe to use for logging. Wait a minute for the reading to stabilize. Double click the button on the probe to initiate logging. The "LOG" icon will be illuminated on the probe display (Fig. 12). When the data collection is complete, double click the button on the probe to turn off logging. The "LOG" icon is no longer illuminated. When the App makes contact with the probe, the log file will be downloaded from the probe to the App on the smartphone or tablet.

Measurements are taken every second but only every 10th measurement is included in the log. The probe can hold up to 8 months of continuous logging. It keeps a rolling set of 32 logs. The oldest logs are removed from the probe as additional logs are added. Logs fall off of the probe but remain stored in the App unless erased.
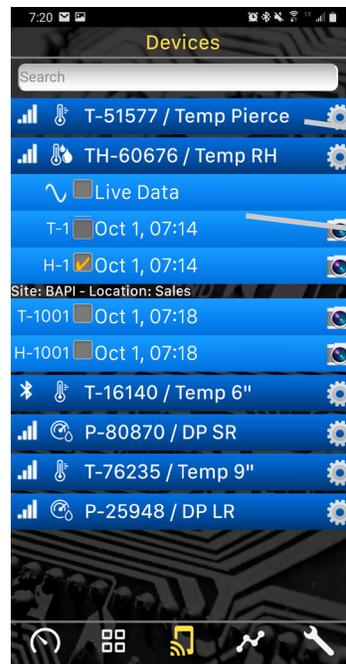
Fig. 13: Devices screen with logs showing for one probe.

Fig. 14: "Name Log and Erase Log" pop-up window.

Fig. 15: "Erase All Logs" pop-up window.

Name a Data Log or Erase a Data Log

A long press (~1 sec) and release on a log bar will open the "Name Log or Erase Log" pop-up window (Fig. 14). You can enter a custom name for the log in the Name field or erase the log with the radio button. Erasing the log only removes it from the App, not the probe. Press OK when done.

Erase All Log Data

A long press (~1 sec) and release on the probe bar (rather than on one of the log bars) opens the "Erase All Logs" pop-up window (Fig. 15). Pressing OK will erase all logs from the probe and from the App. (Note: This is different than the Erase a Data Log function described above which only removes the log from the App, not from the probe.)
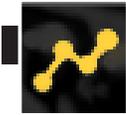
Add a Photo to a Log or View a Log Photo

Tap on the camera icon on the log file to open the "Add a Photo" window. Tap "Take Photo", and once the photo has been taken, tap "Use Photo" to add the photo to that log. Tap on the camera icon on a log file to view the photo for that log. This functionality is beneficial when documenting log files, along with log file names, site, and location.

Search Option

You can also use the search area on the top of the screen to search all logs by location, site or name.

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5 of 12

Section 5: Graph Screen Overview - Blü-Test Application

Tap on the Graph Icon to open the Graphs screen and view the historical graphs of all logs which were given check marks in the Devices screen. Multiple logs can be selected and viewed at once.

Create a Log
If you are displaying live data, you can save this data as a log file. Press the "Create a Log" button to open a popup menu where you can save the data and select an applicable site and location (Fig. 10).

Erase Live Data
Press the "Erase a Log" button to clear the live data that is being displayed on the graph and begin logging live data again. Each graphed line is represented by a same-colored button below. One press on the button will switch the reading from imperial to metric (or vice versa), if applicable. A second press will remove the reading from the graph. Pressing the unselected button again will bring the line back on the graph.

Share a Log
Press the "Share a Log" button to share the log data in CSV format by the method of your choice. The data from all the logs that are currently selected will be included in the CSV file. (Fig. 17) shows the CSV file of the humidity and temp logs shown in Fig. 16 as it comes from the App.

Fig. 16: Graphs screen showing two logs. The red temp log is selected as the primary log so the scale values on the axes only apply to that graph.

Fig. 17: CSV file opened in Microsoft Excel showing the log values from the humidity and temperature Graph screen in Fig. 16.

Section 6: Manage Site/Location in the Tools Menu - Blü-Test Application

The Blü-Test App uses a two-tiered approach to managing site and locations. Sites are the main facility or campus, and Locations are the specific rooms or areas within that facility. Sites and Locations can be entered manually or by importing a file.

Manual Entry of Site/Location
Open the Tools menu by tapping the Tools icon on the right side of the main menu (Fig. 27). Select the "Add Site/Location" bar from the list of bars. This opens a screen displaying all the current sites and locations stored in the App (Fig. 18). To add a new site, enter the name in the Site field, and then press "Add Site"

To add a location to an existing site, select that site in the pull-down menu then enter the name in the Location field and press "Add Location".

To delete a site or location, scroll down to show the Site pull-down menu with the red X (Fig. 19). Select the site and/or location to delete and press the red X. That site and/or location will no longer be available.

Import of File with Site/Location
To import a Site/Location, create a CSV file similar to the approach in Fig. 20, and then upload this file to your smart phone or tablet. Press the Import button in the "Add Site/Location" menu to import the Site and Location data to your App.
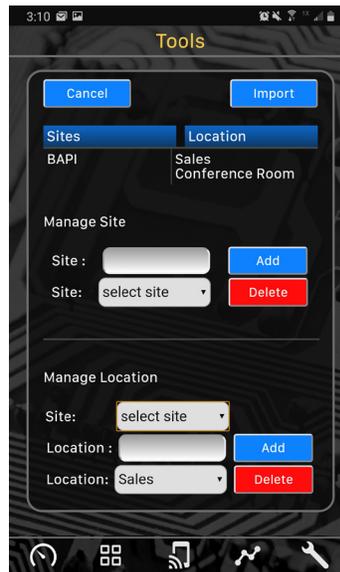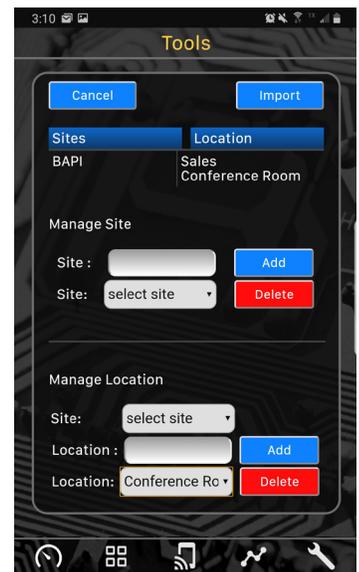

Fig. 18: Add Site/Location screen.

Fig. 19: Delete Site screen

Fig. 20: CSV Site/Location file that can be imported.

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6 of 12

Section 7: Dashboard Screen Overview - Blü-Test Application

Open the Dashboard Screen by tapping on the Dashboard Icon (2nd from left) to view the live readings of all the Blü-Test probes that are currently communicating with the App (Fig. 21). For best performance, no more than six probes should be monitored by the App at one time.

Tap on any of the probes to view the live data from that probe on the Gauge screen (Fig. 22).

For probes with temperature and humidity, the small and large gauges can switch places by tapping on the smaller dial. You can also cycle through the available units of measurement by tapping on the smaller inset circle within a gauge (see next section for more info).

Fig. 21: Dashboard screen showing live data for 6 active Blü-Test probes.

Fig. 22: Gauge screen showing the live data for a temp and humidity probe.

Section 8: Gauge Screen Overview - Blü-Test Application

Tap on any of the probes from the Dashboard screen to view the live data from that probe on the Gauge screen. For probes with temperature and humidity, the small and large dials can switch places by tapping on the smaller dial. You can also cycle through the available units of measurement by tapping on the smaller inset circle within a dial.

Fig. 23: Gauge screen with the %RH as the large dial and the temperature (°F) as the small dial.

Fig. 24: Gauge screen with the temperature (°F) as the large dial and the %RH as the small dial.

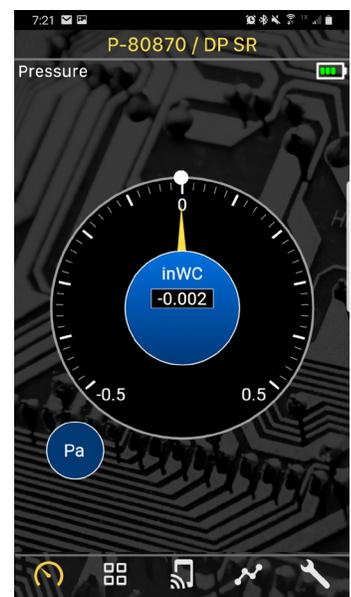**Fig. 25:** Gauge screen with the temperature (°C) as the large dial and the %RH as the small dial.

Fig. 26: Gauge screen with differential pressure being displayed in inches WC. Click Pa to switch to Pascals

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7 of 12

Section 9: Tools Screen Overview - Blü-Test Application

The Tools screen includes a number of helpful tools for checking the accuracy and operation of sensors. These include:

Temperature Transmitter Accuracy Calculator

This tool is used to determine the accuracy of a BAPI T1K 4 to 20 mA Platinum RTD transmitter for a given temperataure range. Just enter the low and high temperature of the range of the transmitter, the unit of measure and the type of RTD sensor: Class A (A), Class B (B), or Averaging (AVG) sensor type. The tool will then provide the transmitter specifications, including the accuracy at 8 and 16 mA, accuracy at 25, 50 and 75% of span, linearity and power output shift.
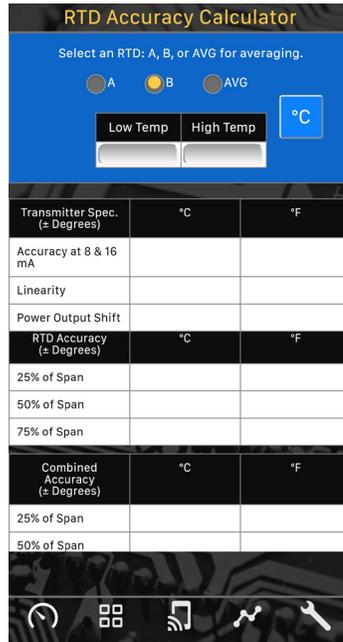

Fig. 28: Temp Accuracy Tool

Fig. 27: Tools Screen

Temperature Finder mA/V

This tool will tell you the temperature for a given output value if you enter the temperature transmitter's temperature range and output range.
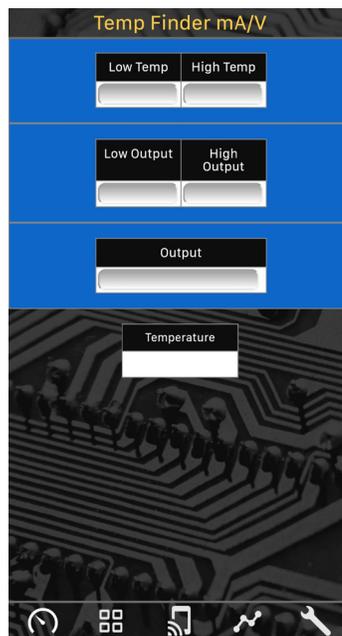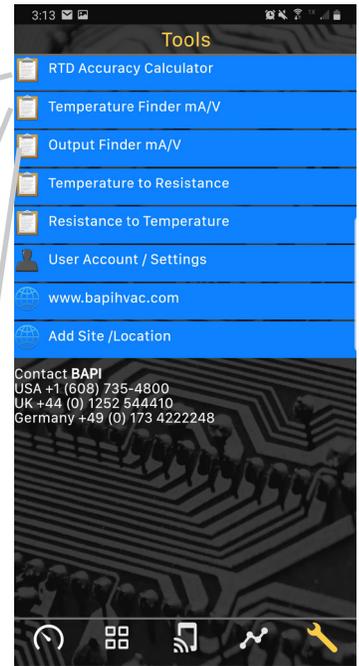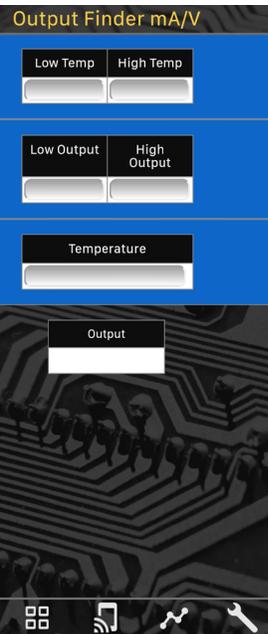

Fig. 29: Temp Finder Tool

Output Finder mA/V

This tool will tell you the output of the sensor for a given temperature if you enter the temperature transmitter's temperature range and output range.

Fig. 30: Output Finder Tool

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8 of 12

Section 9: Tools Screen Overview - Blü-Test Application continued....

The Tools screen includes a number of helpful tools for converting temp to resistance and resistance to temp for various sensors. These include:

Fig. 31: Tools Screen

Temperature to Resistance

This tool will calculate the resistance of a BAPI Thermistor or RTD sensor when you enter a temperature. The most common Thermistor and RTDs are included in the tool.

Fig. 32: Temp to Resistance Tool

Resistance to Temperature

This tool will calculate the temperature when you enter the resistance of the BAPI Thermistor or RTD. The most common Thermistor and RTDs are included in the tool. The tool provides the nominal temperature plus the high and low values that would still be within the specified accuracy of the sensor.
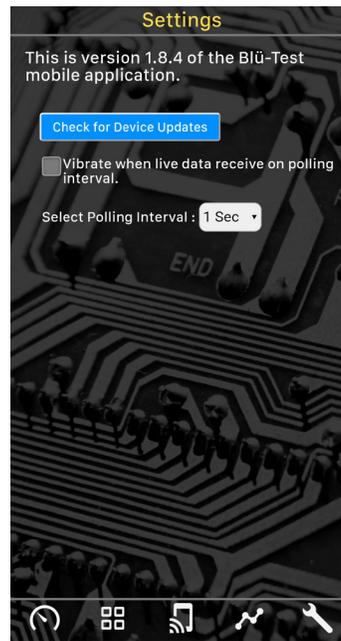

Fig. 33: Resistance to Temp Tool

Fig. 34: Settings Tool

Settings

This tool tells you which version of the Blü-Test App is currently running. It also allows you to check for and download App updates by tapping on the blue "Check for Device Updates" button.

If a firmware update is available, a list of probes that the update applies to will be listed. You can then select the probe (one at a time) that you would like to download the firmware to. Please note, probe firmware downloads can take up to 10 minutes. During this time, your probe will be unavailable, and your smart device should not be interrupted with other applications or processes. In the event that the update is interrupted, reenter the settings screen, click the check for device updates button, and re-initiate the firmware update process.
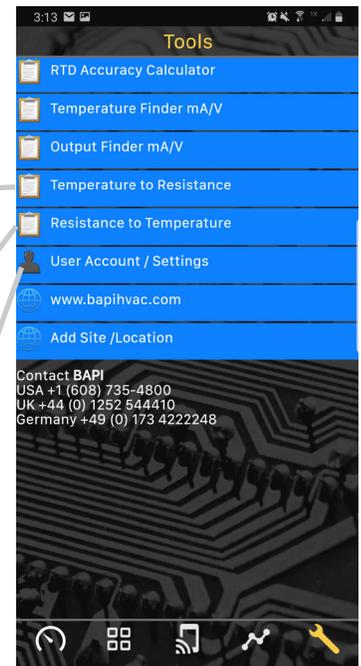
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9 of 12

Section 10: Best Measurement Practices

• Room Sensor measurement is done by holding the Blü-Test probe directly under the sensor enclosure for 3 minutes or until the reading stabilizes. Body heat or breathing on the sensor is a major source of faulty readings, so holding the Blü-Test plastic at the button end and standing away from the sensor is the best way to ensure a good measurement. The Probe Clip Hanger accessory (BA/PCH-1) makes this easier by holding the probe for you (Fig. 35).
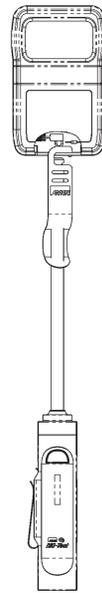
• Duct sensor measurement is done by drilling a 5/8" hole in the duct near the duct sensor to be tested. Insert the Blü-Test probe in the hole so the tip is as close as possible to the duct sensor under test. Hold the Blü-Test probe in place for 2 minutes or until the reading stabilizes. When finished, remove the probe and cover the test hole with duct tape.
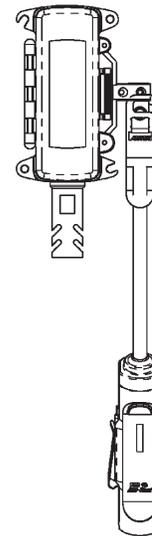
• Duct averaging sensor verification is more difficult. Use the probe clip hanger to clip the probe directly to the averaging sensor at a recommended 10 or more locations along its length. Leave the Blü-Test probe in place for 2 minutes or until the reading stabilizes.

Fig. 35: Probe Clip Hanger used on a room sensor

Fig. 36: Probe Clip Hanger used on an outside air sensor
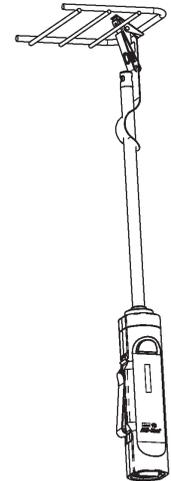
Fig. 37: Probe Clip Hanger used on a wire shelf

• Outside air sensor measurement requires that the Blü-Test probe be placed next to the outside air sensor. This may require a ladder or extension pole. Hold the Blü-Test probe in place for 3 minutes or until the reading stabilizes. The Probe Clip Hanger makes this easier by holding the probe for you (Fig. 36).

• Walk-in freezer/cooler measurements require that the Blü-Test probe be placed in or around the product racks and not near the door. Do not let the probe tip touch the rack. The probe will require more time to stabilize due to the larger differential between room temperature and freezer/cooler temperature. Keep the probe in place for 15 to 20 minutes or until the reading stabilizes. The Probe Clip Hanger makes this easier by holding the probe for you (Fig. 37).

• Immersion dry thermowell measurement can be done as long as the thermowell diameter is big enough. Remove the immersion sensor to be tested and place the Blü-Test Probe into the thermowell. Hold the probe in place for 2 minutes or until the reading stabilizes.

• The piercing temperature probe is designed to be used with "Pete's plugs". It is also designed to be used when piercing a medium is needed such as in insulation or soil.

Section 11: Cleaning

TEMPERATURE ONLY UNITS:
The Blü-Test temperature only units can be cleaned with a damp cloth with an alcohol-based disinfectant or mild soap. Dry with a towel or warm blower after cleaning. The units should not be submerged or placed in a dishwasher.

TEMPERATURE/HUMIDITY UNITS AND DIFFERENTIAL PRESSURE UNITS:
The Blü-Test temperature/humidity and differential pressure units can be cleaned with a damp cloth with an alcohol-based disinfectant or mild soap, but DO NOT get the tip of the temp/humidity probe wet in any way, and do not let liquid enter the ports of the differential pressure unit. Dry with a towel or warm blower after cleaning. The Blü-Test units should not be submerged or placed in a dishwasher. If liquid does infiltrate the probe tip of the temp/humidity unit, remove liquid immediately with a paper towel or cotton swab and dry with a warm blower. If grease infiltrates the probe, the unit may be damaged. Send it back to BAPI for service.

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10 of 12

Section 12: Storage

Handle the unit with care because dropping or high vibrations could cause the battery to shake loose or the probe support to crack. The Blü-Test unit should be stored in a dry location with ambient temperatures between: <1 month, -20 to 50°C (-4 to 122°F) • 1 to 3 months, -20 to 40°C (-4 to 104°F) • 3 months to 1 yr, -20 to 20°C (-4 to 68°F)

Section 13: Diagnostics

Possible Problem: The probe will not link-up with the Bluetooth display device.

1. Be sure the display device has the Blü-Test App loaded and is Android OS 4.4 (KitKat) or Apple iOS 9 or higher.
2. Be sure the display device and the probe are close enough to each other (<30' open air) and that both are turned on.
3. Cycle power to both the probe and the display device.
4. Verify that Bluetooth communication is turned on in your device.

Possible Problem: The temperature or humidity is not accurate.

1. Make sure the Blü-Test probe tip is near to the reference or field device.
2. Make sure that independent drafts are not affecting the reference or the Blü-Test probe.
3. Allow the Blü-Test probe to acclimate to the air before registering the reading. This may take between 2 to 5 minutes.

Section 14: Recalibration

The Blü-Test unit is factory calibrated and comes with an NIST traceable certificate. The certificate is accessible via the probe information screen. You can access this area in the Devices screen, and then click the gear icon next to the probe that you would like to review. The Blü-test should be re-calibrated once every year as a standard practice. The unit cannot be field calibrated and must be calibrated at the factory, which includes a thorough inspection, cleaning, calibration and an NIST traceable re-certification.

Section 15: Specifications

Blü-Test Probe Specifications

Power:
3.7V, 2,600 mAh Rechargeable Battery (non-serviceable) (charger cable included)

Charging Specifications:
Standard USB Charger, 4.25 to 5.5V, Less than 1.5A

Environmental Range:
Unit's Base: -22 to 158°F (-30 to 70°C)
Temp Probes: -40 to 185°F (-40 to 85°C)
%RH Probe: 5 to 95% Non-condensing
Pressure Probe: -4 to 158°F (-20 to 70°C)

Measurement Range:
Temp: -40 to 185°F (-40 to 85°C)
%RH: 0 to 100% Non-condensing
LR Pressure: -1 to +1" WC (-250 to +250 Pascal)
SR Pressure: -5 to +5" WC (-1,250 to +1,250 Pascal)

Accuracy - Temperature Only Units:
Temp: ±0.18°F from -13 to 167°F (±0.1°C from -25 to 75°C)

Accuracy - Temp/Humidity Units:
Temp: ±0.36°F at 77°F (±0.2°C at 25°C)
%RH: ±1%RH at 77°F (25°C) from 10 to 85%RH

Accuracy - Differential Pressure Units:
Low Range: ±0.25% of FS Span, -1 to +1" WC (-250 to +250 Pa) at 77°F (25°C)

Standard Range: ±0.25% of FS Span,
-5 to +5" WC (-1,250 to +1,250 Pa) at 77°F (25°C)

Blü-Test Probe Specifications continued...

Communication: Bluetooth LE Class 2 v4.2, Up to 30 ft
Data Transfer: Updates to display every 10 sec
Security: AES-128
Agency: RoHS, NIST Traceable Certificate
FCC ID: Contains FCC ID 2AA9B04

Blü-Test App Specifications

Application Program: *Android OS 4.4 (KitKat) or Apple iOS 9 or higher required

Bluetooth: For best experience, use BlueTooth version 4.1 or higher

Display: Display on probe or device
Measured Data:. Temp. (°F/°C), Temp. & %RH or Differential Pressure (WC or Pascals)
Time Stamp: ...... Date and 24 hour time
Location: .... Uses location of device
Save: .... Saves current data, time & location
Log: .... Show trend data on screen
Email: .... Sends data log to any email address

Note: A user supplied Android or iOS device is required to access logged data.

Specifications subject to change without notice.