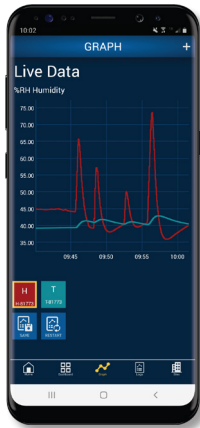


Blü-Test Wireless Test Instruments

Operations Manual & User Guide



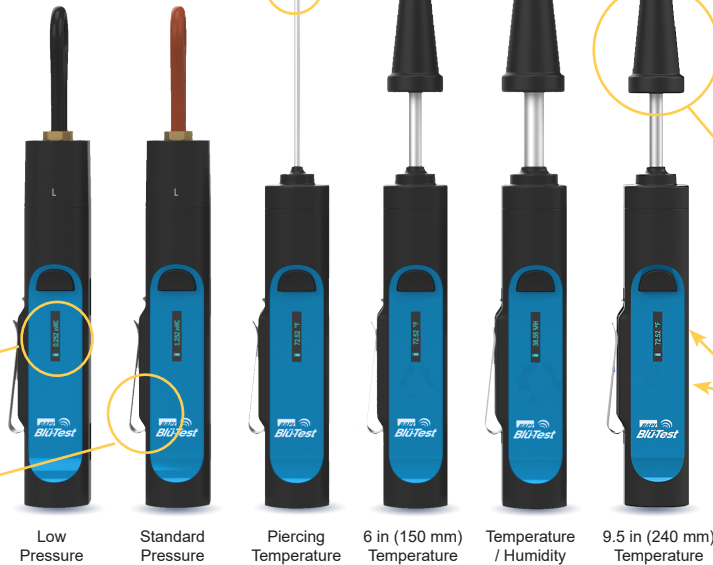
Gauge



Graph

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

Reversible belt clip



Low Pressure

Standard Pressure

Piercing Temperature

6 in (150 mm) Temperature

Temperature / Humidity

9.5 in (240 mm) Temperature

Open tip for measuring temperature and humidity

Sealed piercing tip

Probe Clip Hanger for attaching to room units and grilles

Sealed probe tip can be used in liquids

Adjustable rubber duct cone allows hands-free measuring in ducts

Magnetic side panels for secure mounting on metal

Communicates via Bluetooth with your Android™ or iOS Smartphone 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



Download app from App Store



Download app from Google Play

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Sect. 1: Overview and Identification

Blü-Test is a suite of handheld testing probes that communicate via Bluetooth 4.2 up to 30 feet (10 meters) to the user’s enabled Android or iOS Smartphone 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 smartphone 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 smartphone 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.)

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 Smartphone 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 10 or higher.

Loading the Blü-Test App:

1. Access the Google Play Store or Apple 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 install on your device.

Connecting to a Probe:

Turn on the Probe by pressing the button and then open the Blü-Test App. Probes will connect automatically and be shown on the Dashboard Screen. If Bluetooth on your device is turned off, the app will ask if you want to turn it on. Click on a dashboard tile for a probe, and you will be able to see a Gauge view of the probe reading, view log files on that probe, and the settings screen of that probe.



Fig. 2: Blü-Test Application Icon (above) and Initial Screen (right)

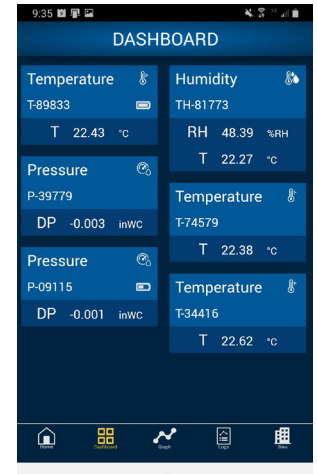


Fig. 3: Dashboard Screen showing multiple active Blü-Test probes. Blü-Test Home Screen

Sect. 3: Probe Information

The probe has a rechargeable 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 in sleep mode. If the unit is on and awake, a single button press 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 a million readings of log data on board. Periodic deleting of logs from the probe is required. |

Battery Charging

The probe has a rechargeable battery and requires periodic charging with the supplied USB cable that plugs into the micro USB port on the back of the unit. The battery icon on the display will indicate that the unit is charging. Initial charging is recommended as the probe is shipped with the battery partially charged.



Fig. 4: Blü-Test Probes



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

Section 4: Dashboard Screen Overview - Blü-Test Application

Navigate to the Dashboard Screen by either clicking the Dashboard option from the Home Screen, or clicking the Dashboard icon on the bottom of all screens. The Dashboard Screen (Fig 7) provides an overview of all the Blü-Test probes that are turned on and within range of the smart device. The application performs best when the number of Blü-Test probes that are being communicated with at any given time is limited to 6 or less; however, the app can communicate with more than six probes at the same time.

VIEW A PROBE

To view a specific probe, simply click on the tile for that probe in the Dashboard. This opens the Gauge View screen. From this screen, you can also open the Logs screen and Setting screen.

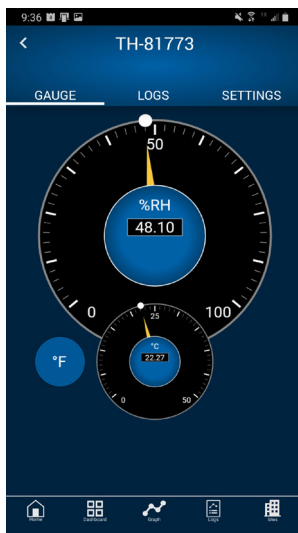


Fig. 8: Gauge View Screen

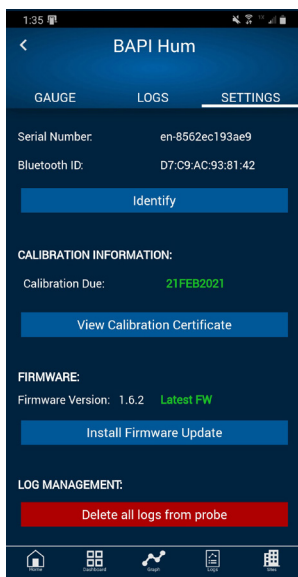


Fig. 10: Settings Screen

Gauge View Screen

The Gauge View gives live readings from the selected Blü-Test probe. For probes with temp and humidity, the small and large dials can switch places by tapping on the smaller dial. You can also cycle through the units of measurement by tapping on the unit of measure icon on the lower left of the screen (°F in Fig 8).

Probe Logs Screen (showing logs stored on a probe)

Click on the word Logs to open the Logs Screen for the probe. This shows a list of all logs that are stored on the probe and available for download to the application. Logs are created on the probe by pressing the probe button twice. The word LOG will appear and flash next the battery icon on the probe display when it is logging. Pressing the button twice again terminates the current log and turns logging off. After a moment, the log file will appear in the Probe Logs Screen and be available for download.

Fig 9 shows two log files that are checked for download from the probe to the Blü-Test application. Click the top left “Download” button to download the checked files to your device, or click the white down arrow to download individual files. The down arrow (indicating logs are available for download) will change to an empty circle to show that the logs are in the download queue. The empty circle start to fill to show the download progress. When the download is complete, the log files will appear in the “unassigned logs” area of the Application Log Screen (See pg. 5), and will be removed from the Probe Logs Screen shown in Fig 9.

Probe Settings Screen

The Settings Screen for the probe (Fig 10) displays specific information for that probe, and lets you modify the name (up to 12 characters) as well as view the calibration certificate, update firmware, and delete all logs from that probe. Pressing the “Identify” button displays the name of the probe in the probe display so you can tell which probe it is.

NOTE ON FIRMWARE UPDATES: Do not leave the Firmware Update Screen once the “Install Firmware Update” button is clicked. Moving from this screen to a different application or to answer a phone call or a text before the update has completed will interfere with the updating process and potentially render your probe inoperable.

Note on Probe Logging Mode: If your probe will not go into logging mode, this could be an indication that the onboard log memory for the probe is full. Clicking the “Delete all logs from probe” button at the bottom of the Settings Screen will clear the memory of that probe.

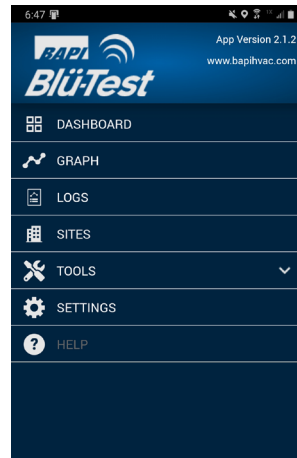


Fig. 6: Home Screen

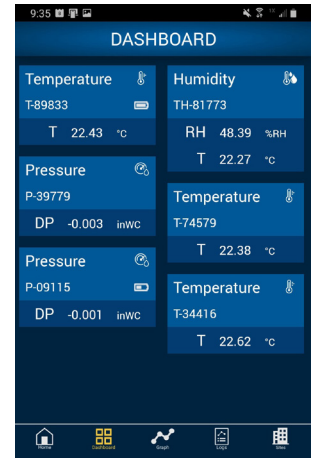


Fig. 7: Dashboard Screen showing six active Blü-Test probes.

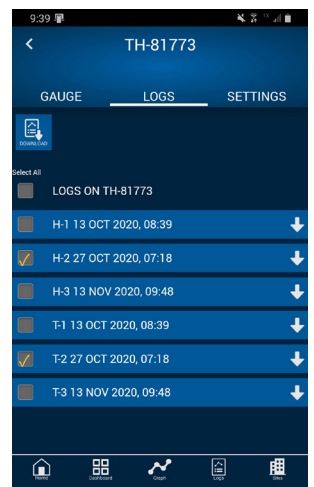


Fig. 9: Probe Logs Screen showing logs stored on probe TH-81773.



Section 5: Graph Screen Overview - Blü-Test Application

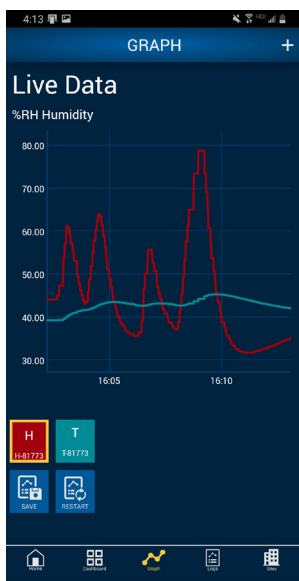


Fig. 11: Graph Screen showing two logs. The red humidity log is selected as the primary log so the scale values on the axes only apply to that graph.

The Graph Screen (Fig 12) trends “Live Data” from up to 6 probes. The graphed data can also be saved as a log by clicking the “Save” button, and the log files will appear in the “unassigned logs” area of the Application Log Screen described in the next section.

To select probes to graph, click on the graphs icon and then click the add probes “+” button in the upper right corner of the initial Graph Screen (Fig 12). This brings up the list of active probes (Fig 13). Click the check box of up to six probes to graph, and then tap the arrow in the upper left corner or press the Graph symbol at the bottom.

This brings up the Graph Screen showing the live trend. The red humidity log is highlighted as the primary log in Fig 11 so the scale values on the axes only apply to that graph.



Fig. 12: Initial Graph Screen showing the add probes “+” button to add probes.

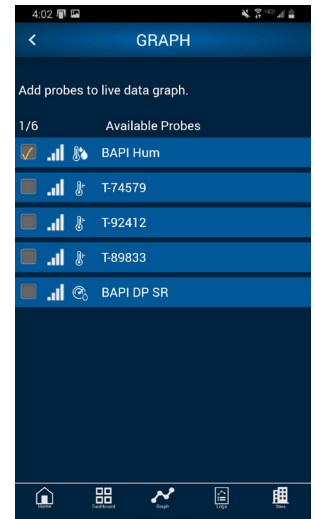


Fig. 13: Graph Screen after the add probes “+” button has been pressed. The check box has been clicked on the first probe for graphing.



Section 6: Application Logs Screen Overview - Blü-Test Application

The Application Logs Screen (different from the “Probe Logs Screen” described in Sect. 4) is where the Blü-Test Application stores the log files that have either been downloaded from a probe (as described in Sect. 4), or saved as live data in the Graphs Screen (as described in the section above).

Saved log files are initially displayed in the “unassigned” area of the Application Logs Screen (Fig 14) until they have been assigned to a specific Site or Location (as described in Sect. 7).

The Application Logs Screen lets you manage the log files that have been downloaded to the application. The three icons to the right of the log allow you to view a graphical representation of the log, edit the log site, location or name (Fig 15) or add a photo to the log. The search bar at the top lets you search for specific logs within the application. The “Send” button below the search bar lets you send selected logs as comma-separated values (.csv) files via email. The “Delete” button lets you delete selected logs, while the “Assign” button lets you assign the selected log to a site or location.

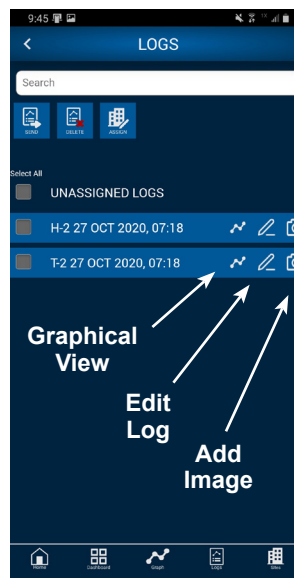


Fig. 14: Logs Screen

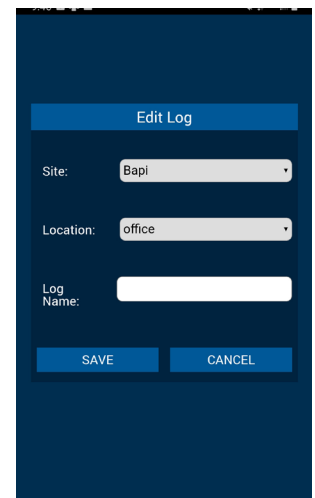


Fig. 15: Edit Logs Screen



Section 7: Sites Screen Overview - 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. You can also delete sites and locations from the sites and locations screens, along with exporting a comma-separated values (.csv) file of your sites and locations.

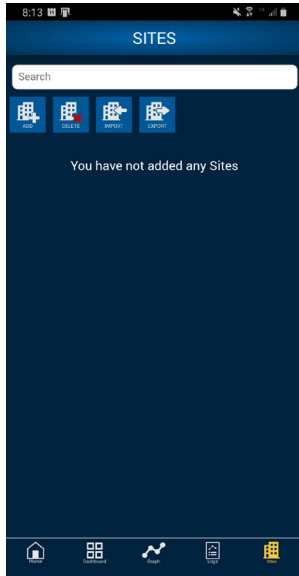


Fig. 16: Sites Screen before adding sites

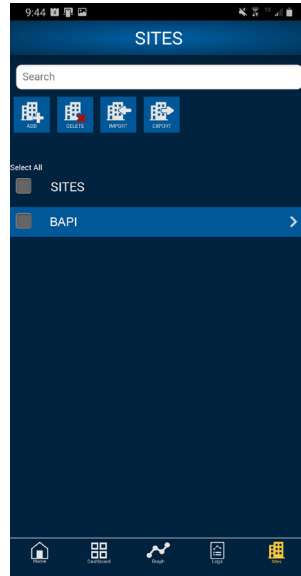


Fig. 17: Sites Screen with site added

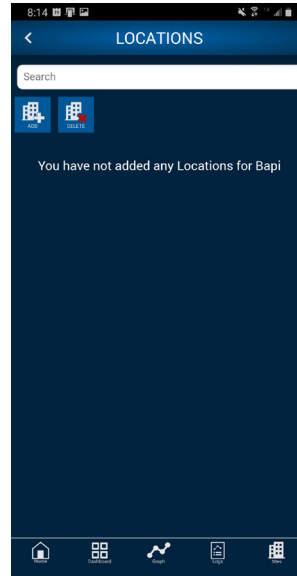


Fig. 18: Locations Screen before adding locations

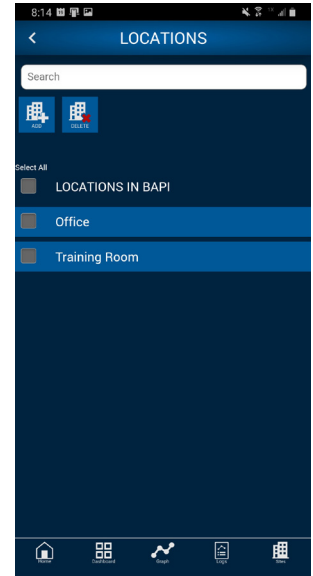


Fig. 19: Locations Screen with locations added to BAPI site

IMPORTING SITES AND LOCATIONS

To create a .csv file for import, simply create an Excel spreadsheet as shown in Fig 20. Save the Excel file as a .csv file, and email or save the .csv file to your smart device. Go to the Sites Screen on the Blü-Test App and click the “Import” button. Find the file that you would like to import (usually in the downloads folder) and then select it and download it to your smart device.

A	B	C
1	Sites	Locations
2	Building1	Location1
3	Building1	Location2
4	Building1	Location3
5	Building1	Location4
6	Building1	Location5
7	Building1	Location6
8	Building2	Location1
9	Building2	Location2
10	Building2	Location3
11	Building2	Location4
12	Building2	Location5
13	Building2	Location6
14		
15		
16		
17		
18		

Fig. 20: Import .csv File Example

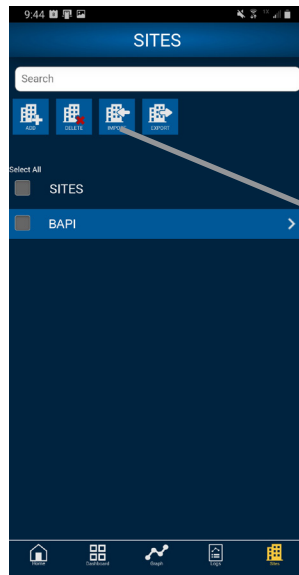


Fig. 21: Import Sites

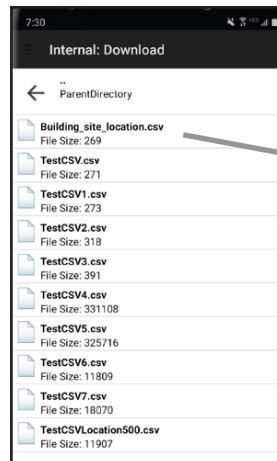


Fig. 22: Select file to import

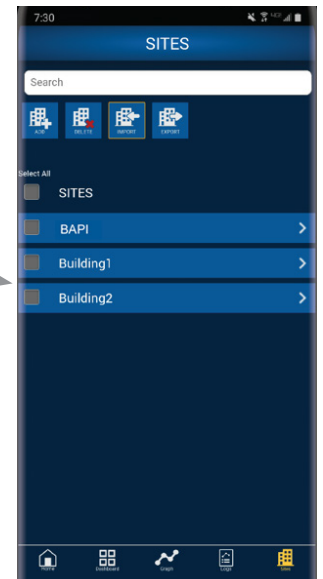


Fig. 23: Sites added to Blü-Test App



Section 8: Tools Section of the Home Screen - Blü-Test Application

The Tools Section of the Home 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 temperature 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.

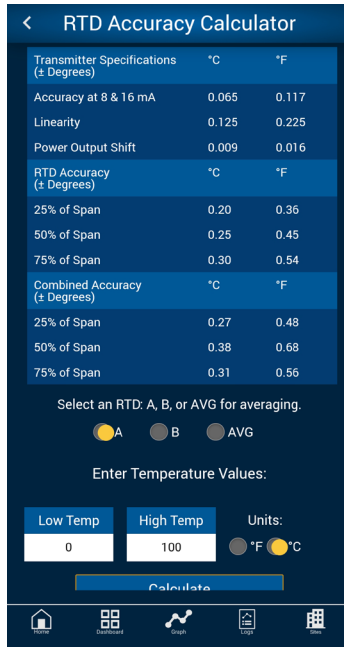


Fig. 25: Temp Accuracy Tool

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.

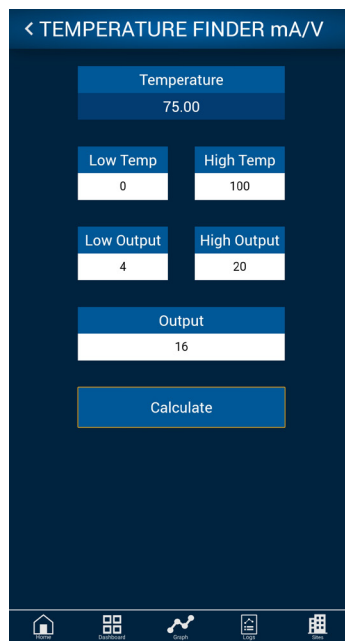


Fig. 26: Temp Finder Tool

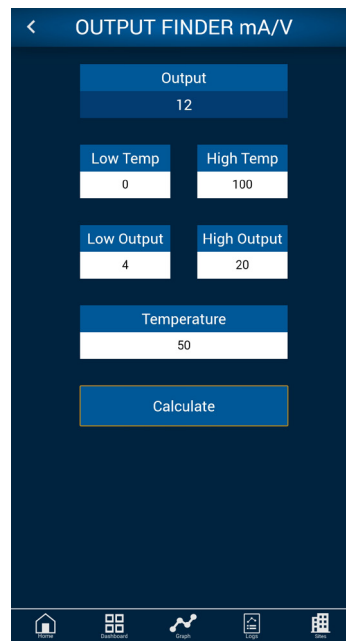


Fig. 27: Output Finder Tool

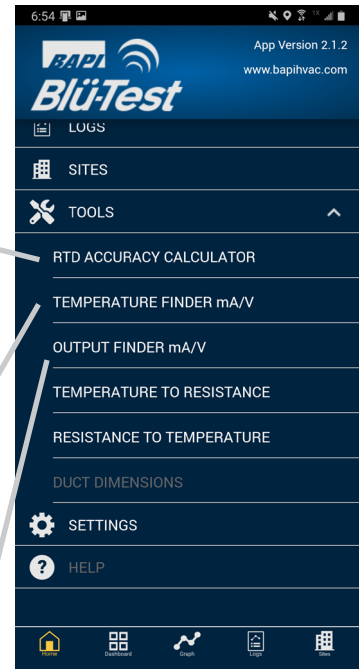


Fig. 24: Tools Section of the Home Screen



Section 8: Tools Section of the Home Screen - Blü-Test Application continued...

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

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.

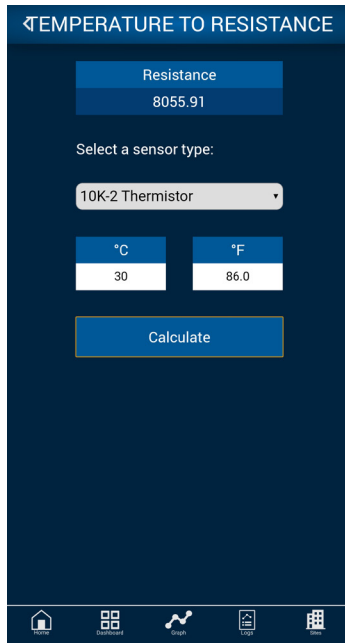


Fig. 29: Temp to Resistance Tool

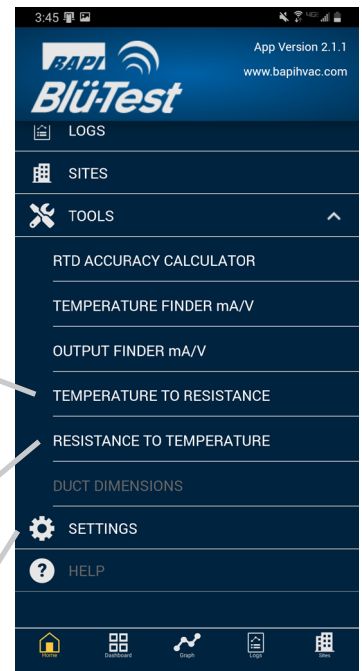


Fig. 28: Tools Section of the Home Screen

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.

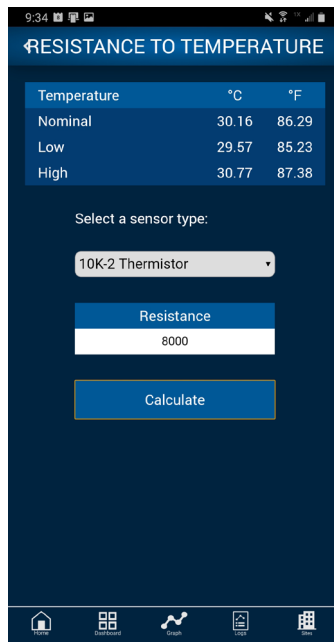


Fig. 30: Resistance to Temp Tool

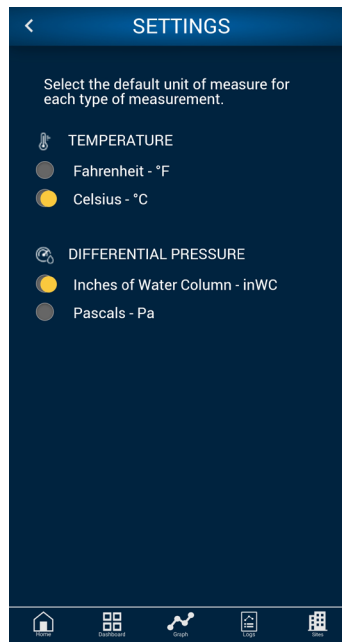


Fig. 31: Settings Tool

Settings

The application Settings Screen allows the user to make universal changes to the units of measure for any probes that the application discovers. Changes to specific probes can still be made via the gauges view of the specific probe.

Section 9: 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 probe 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) simplifies this by holding the probe for you (Fig. 32).
- Duct sensor measurement is done by drilling a 5/8" (15mm) 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 10 or more locations along its length. Leave the probe in place for 2 minutes or until the reading stabilizes.
- 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. 33).
- Walk-in freezer/cooler measurements require that the 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. 34).
- 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.

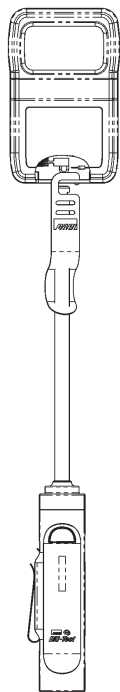


Fig. 32: Probe Clip Hanger used on a room sensor

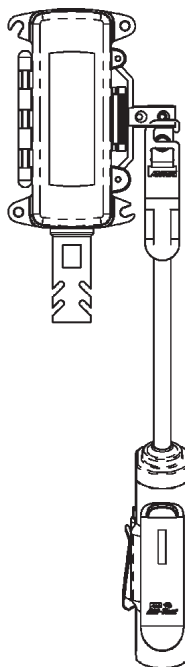


Fig. 33: Probe Clip Hanger used on an outside air sensor

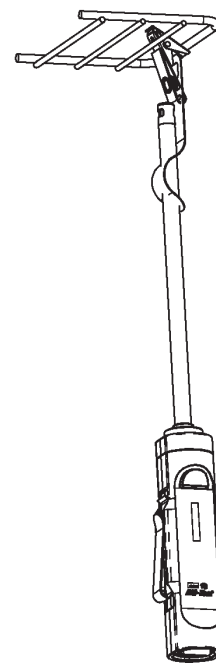


Fig. 34: Probe Clip Hanger used on a wire shelf

Section 10: 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. A double-ended brush is included to help with cleaning the seams on the body the probe. 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. A double-ended brush is included to help with cleaning the seams on the body the probe. 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.



Fig. 35: Brush included for cleaning seams

Note: The Temperature-Only Probes are NSF compliant and must be cleaned in a means that is acceptable to your local food inspector and/or regulatory compliance manager.

Section 11: 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) • 1-3 months: -20 to 40°C (-4 to 104°F) • 3-12 months: -20 to 20°C (-4 to 68°F)

Section 12: 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 10 or higher.
2. Be sure the display device and the probe are turned on and close enough to each other (<30ft or 10m open air).
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

Possible Problem: Probe will not go into logging mode.

1. Your onboard memory on the probe may be full. To clear the memory, go to the probe settings screen via the dashboard. Click "Delete all logs from probe" button to erase log files from the probe.

Possible Problem: Log file is not downloading from the probe.

1. The log file may be very large so give it time to download. A week-long log file can take up to 30 minutes to download from the probe to the application. This is normal behavior.

Possible Problem: iOS smart device cannot mail csv files.

1. Make sure the standard iOS mail application enabled on your smart device.

Section 13: Recalibration

The Blü-Test unit is factory calibrated and comes with an NIST traceable certificate. The certificate is accessible via the Probe Settings screen. You can click the "View Calibration Certificate" button to view the certificate. 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 14: 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:

Probe Body: -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 @ -40 to 158°F (-40 to 70°C)
Pressure Probe: -4 to 158°F (-20 to 70°C)

Measurement Range:

Temp: -40 to 185°F (-40 to 85°C)
%RH: -5 to 95% Non-condensing @ -40 to 158°F (-40 to 70°C)
Differential Pressure, Low Range: -1 to +1" WC (-250 to +250 Pascal) @ -4 to 158°F (-20 to 70°C)
Differential Pressure, Standard Range: -5 to +5" WC (-1,250 to +1,250 Pascal) @ -4 to 158°F (-20 to 70°C)

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

Burst Pressure - Differential Pressure Units:

Low Range: 415" WC (103 kPa)
Standard Range: 500" WC (124 kPa)

Communication: Bluetooth LE Class 2 v4.2

Data Transfer: 10 second intervals

Security: AES-128

Agency: RoHS, CE, NSF, NIST* Traceable Certificate



FCC ID: 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.

FCC Rules Part 15: <https://www.fcc.gov/media/radio/low-power-radio-general-information#PART15>

Blü-Test App Specifications

Application Program: *Android OS 5.1 or Apple iOS 10 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 and location

Log:Shows trending 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.

*NIST is the National Institute of Standards and Technology

Specifications subject to change without notice.



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