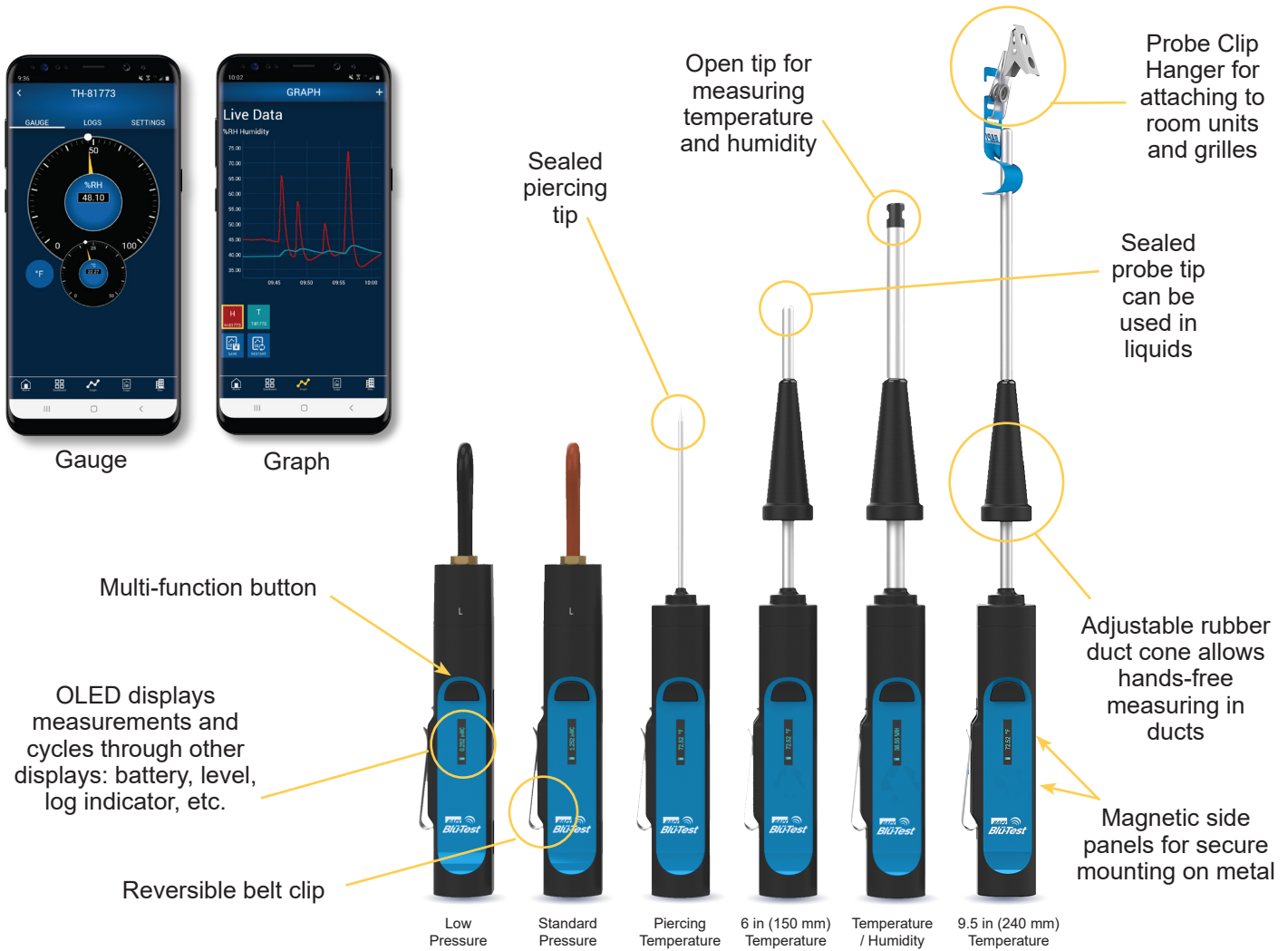


Blü-Test Wireless Test Instruments

Operations Manual & User Guide



Communicates via Bluetooth with your Android™ and 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 test instruments that communicate via Bluetooth 4.2 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. Press the multi-function button on the probe body to turn it on. View live readings in the OLED display. Double press the button to begin logging.

Many more features are available by using the Blü-Test App on your smartphone or tablet.

- View the current reading from a single or multiple probes
- View live trend data in a graph
- Download log files from the probe
- Review downloaded log files in a graph
- Email downloaded log files for use in commissioning, troubleshooting or comparing against the BAS.



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: Probe Operation

BAPI recommends that you fully charge the battery with the supplied USB cable prior to first use.

Button Press

Functionality

One button press Turns unit on.

Wakes the unit if it is in sleep mode.

If the unit is on and awake, 1st press selects °C for the display.

2nd press selects °F for the display.

Additional single presses cycle through: Display Type (°C/°F on temp units) (%RH/°C/°F on temp/humidity units) (WC/Pascals on pressure units), Firmware Version, Sensor Type, Sensor ID, Serial Number, Battery Charge Level in %, and Part Number.

Two quick presses Toggle logging of readings on/off. The word "LOG" is shown on the OLED display next to the battery icon when the probe is logging data. You must turn off logging for the log file to be saved in the probe's memory and be visible in the Blü-Test App.



Fig. 2: Closeup of the OLED display

Press and hold Hold for 2 seconds to turn unit off.

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 can store up to a million readings in a maximum of 31 log files. Once the memory is full, a new log file will automatically overwrite the oldest log file. The Blü-Test App is needed to periodically delete all log files on a probe.

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.

Sect. 3: 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 5.1 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. 3) and select "Install" to install on your device.



Fig. 3: Blü-Test Application Icon

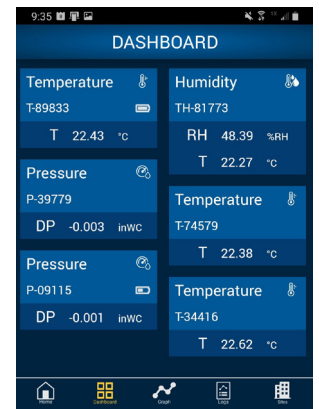


Fig. 4: Dashboard Screen showing multiple active Blü-Test probes. Blü-Test Home Screen

Connecting to a Probe:

Turn on the probe and open the Blü-Test App. If Bluetooth on your device is turned off, the App will ask permission to turn it on. Probes will connect automatically within 30 seconds and be shown on the Dashboard Screen.

Sect. 4: Dashboard Screen Overview - Blü-Test Application

The Blu-Test App is used to manage our full suite of test instruments. Visit our website to see the other probes in the suite.

Navigate to the Dashboard Screen by either tapping the Dashboard option from the Home Screen, or tapping the Dashboard icon on the bottom of all screens. The Dashboard Screen (Fig 6) provides an overview of all the Blü-Test probes that are connected. The application performs best with 6 or less connected probes; however, the App can communicate with more than six probes at the same time.

VIEW A PROBE

To view a specific probe, simply tap 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.

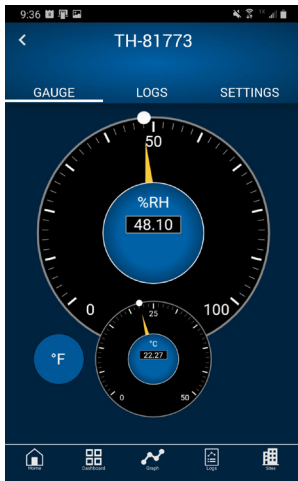


Fig. 7: Gauge View Screen

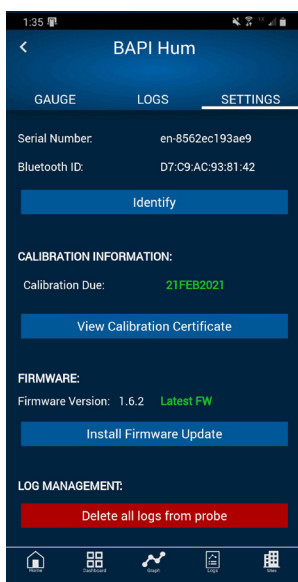


Fig. 9: Settings Screen

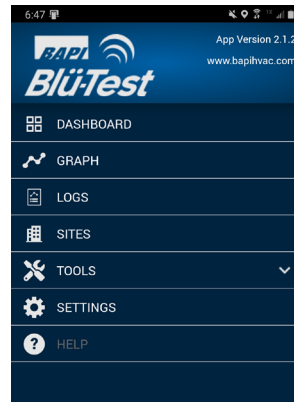


Fig. 5: Home Screen

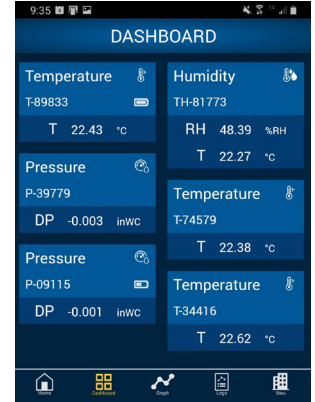


Fig. 6: Dashboard Screen showing six active Blü-Test probes.

Gauge View Screen

The Gauge View gives live readings from the selected Blü-Test probe. You can cycle through the units of measurement by tapping on the unit of measure icon on the lower left of the screen (°F in Fig 7).

Probe Logs Screen (showing logs stored on that probe)

Tap on the word Logs to open the Logs Screen. This shows a list of all logs that are stored on that probe and available for download to the application. See Sect. 2 for logging instructions.. Note: Logging must be turned off on the probe for the new log file to be created and appear in the App.

Fig 8 shows two log files that are checked for download from the probe to the Blü-Test application. Tap the top left “Download” button to download the checked files to your device, or tap 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 will 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 Sect. 6), and will be removed from the Probe Logs Screen shown in Fig 8.

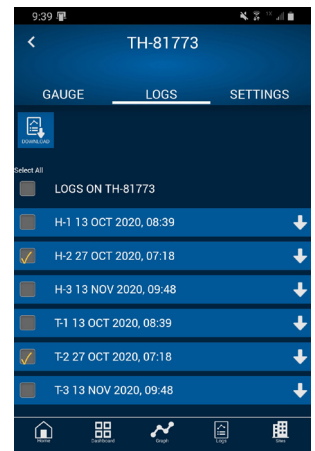


Fig. 8: Probe Logs Screen showing logs stored on probe TH-81773.

Probe Settings Screen

The Probe Settings Screen (Fig 9) 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’s OLED 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 tapped. 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. Tapping the “Delete all logs from probe” button at the bottom of the Settings Screen will clear the memory of that probe.



Sect. 5: Graph Screen Overview - Blü-Test Application



Fig. 10: 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 10) trends “Live Data” from up to 6 probes. The graphed data can also be saved as a log by tapping 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, tap on the graphs icon and then tap the add probes “+” button in the upper right corner of the initial Graph Screen (Fig 11). This brings up the list of active probes (Fig 12). Tap 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 10 so the scale values on the axes only apply to that graph.



Fig. 11: Initial Graph Screen showing the add probes “+” button to add probes.

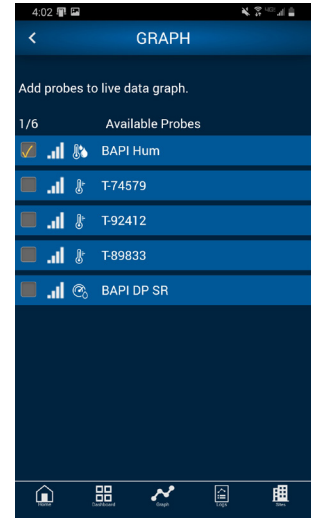


Fig. 12: Graph Screen after the add probes “+” button has been pressed. The check box has been tapped on the first probe for graphing.



Sect. 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 Sect. 5).

Saved log files are initially displayed in the “unassigned” area of the Application Logs Screen (Fig 13) 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 14) 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.

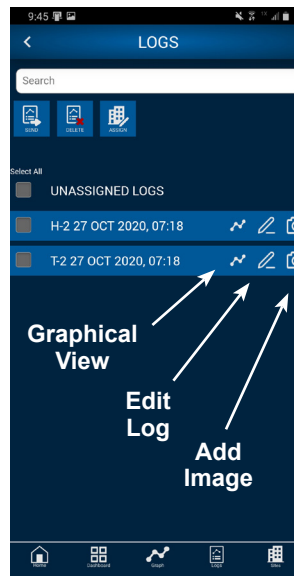


Fig. 13: Logs Screen

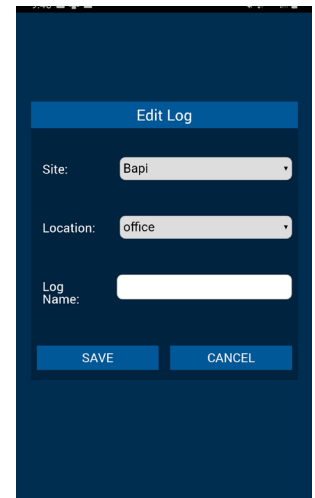


Fig. 14: Edit Logs Screen

Sect. 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.

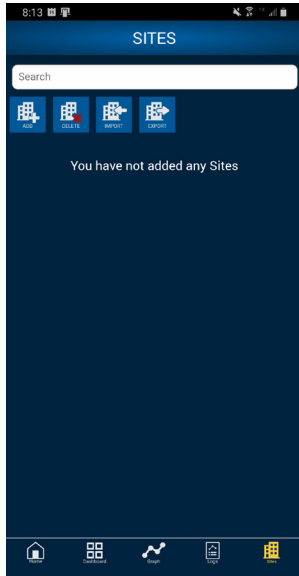


Fig. 15: Sites Screen before adding sites

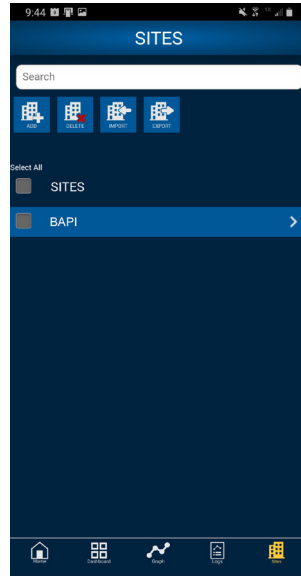


Fig. 16: Sites Screen with site added

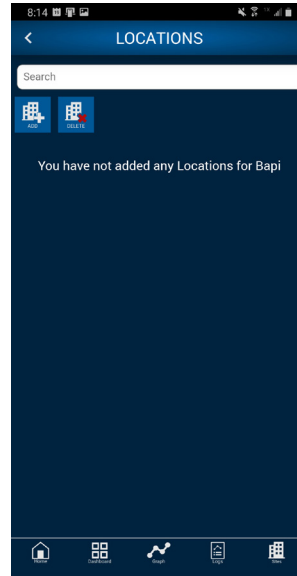


Fig. 17: Locations Screen before adding locations

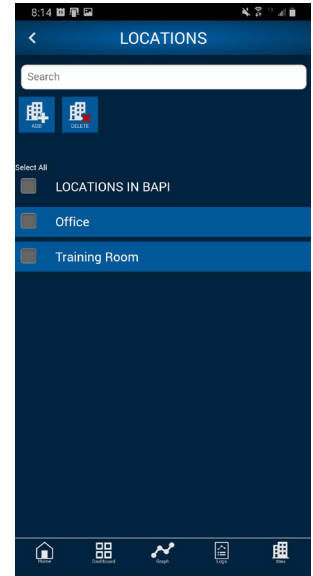


Fig. 18: Locations Screen with locations added to BAPI site

IMPORTING SITES AND LOCATIONS

To create a .csv file for import, simply create an Excel spreadsheet as shown in Fig 19. 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 tap 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. 19: Import .csv File Example

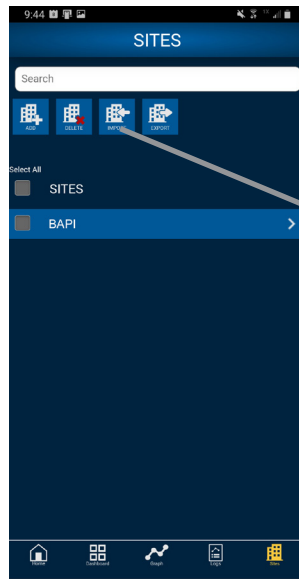


Fig. 20: Import Sites

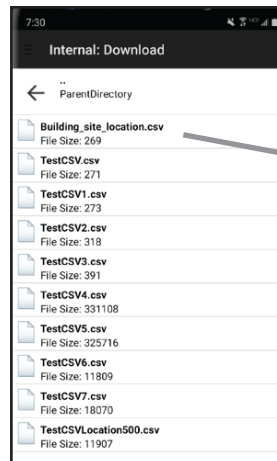


Fig. 21: Select file to import

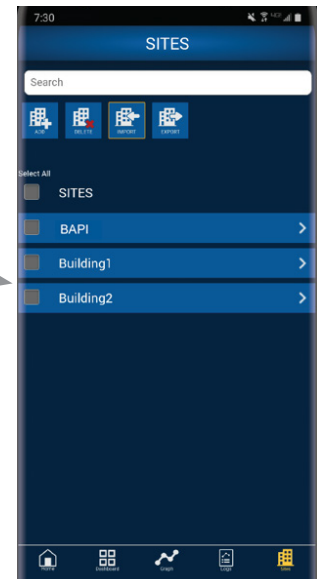


Fig. 22: Sites added to Blü-Test App



Sect. 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.

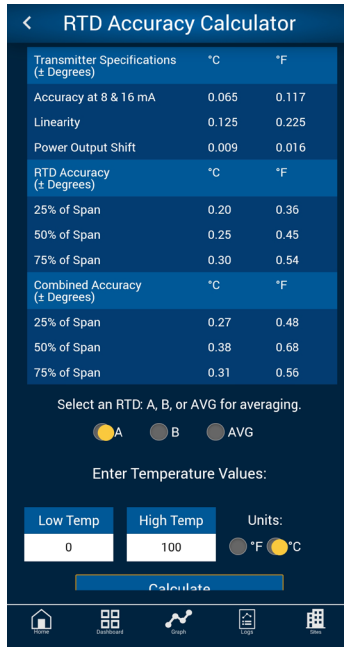


Fig. 24: Temp Accuracy Tool

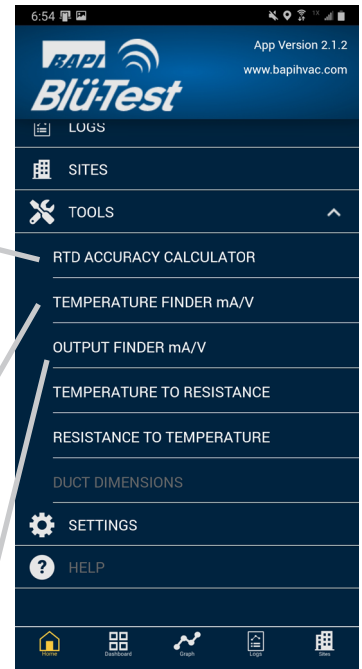


Fig. 23: Tools Section of the Home Screen

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.

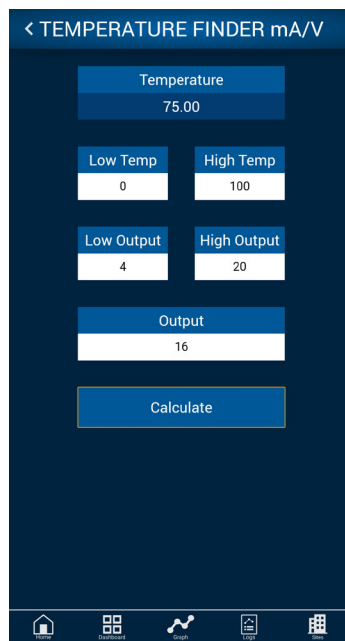


Fig. 25: Temp Finder Tool

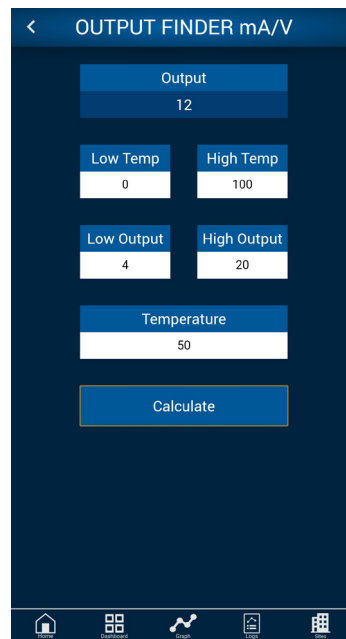


Fig. 26: Output Finder Tool

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.



Sect. 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 Thermistors and RTDs are included in the tool.

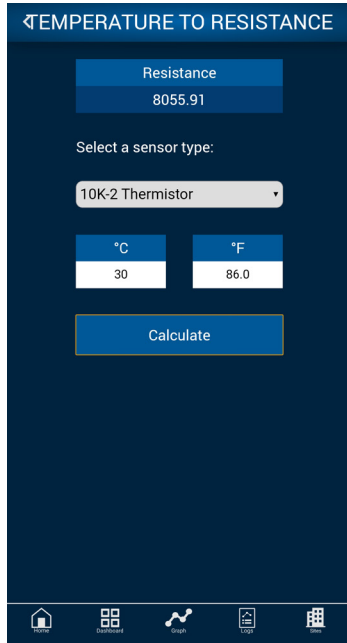


Fig. 28: Temp to Resistance Tool

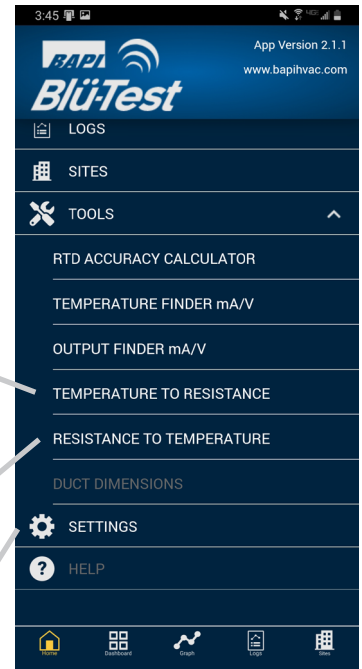


Fig. 27: Tools Section of the Home Screen

Resistance to Temperature

This tool will calculate the temperature when you enter the resistance of the BAPI Thermistor or RTD. The most common Thermistors 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.

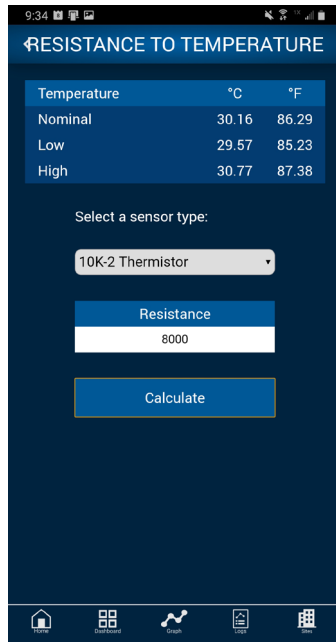


Fig. 29: Resistance to Temp Tool

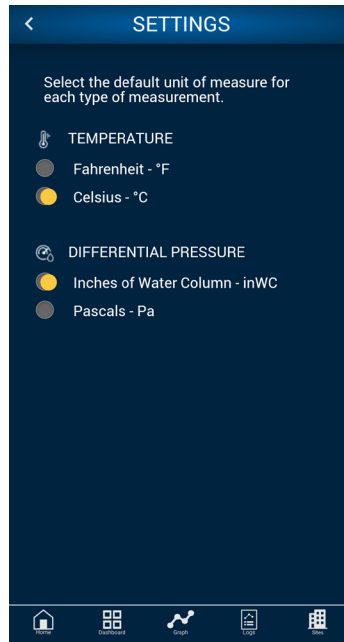


Fig. 30: Settings Tool

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.

Sect. 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. 31).
- 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. 32).
- 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. 33).
- 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.

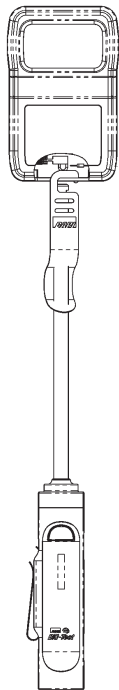


Fig. 31: Probe Clip Hanger used on a room sensor

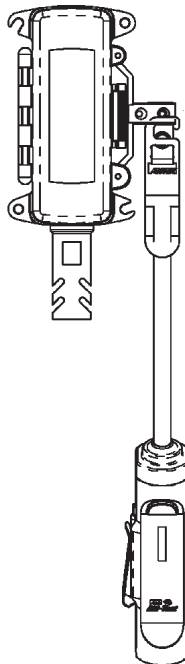


Fig. 32: Probe Clip Hanger used on an outside air sensor

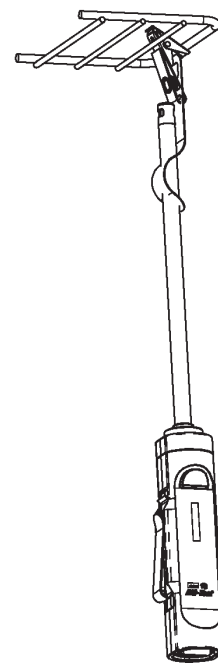


Fig. 33: Probe Clip Hanger used on a wire shelf

Sect. 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 of 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. 34: Brush included for cleaning seams

Note: The Piercing Temperature Probe is NSF certified and must be cleaned in a means that is acceptable to your local food inspector and/or regulatory compliance manager.

Sect. 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 to 3 months: -20 to 40°C (-4 to 104°F)
- 3 to 12 months: -20 to 20°C (-4 to 68°F)

Sect. 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 5.1 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.
5. For Android devices, location services MUST be enabled for Blü-Test to work correctly. On your Android device, go to Settings, select Location, and make sure Location is on.

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. Tap "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 is enabled on your smart device.



Sect. 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 tap 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.

Sect. 14: Specifications

Power:

3.7V, 2,600 mAh Rechargeable Battery

Charging:

Standard USB Charger, 1.5A or greater, Micro-USB cable included

Measurement Range:

Temperature: -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 Probes:

±0.18°F from -13 to 167°F (±0.1°C from -25 to 75°C)

Accuracy - Temp/Humidity Probes:

Temperature: ±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 Probes:

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)

Burst Pressure - Differential Pressure Probes:

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

Communication:

Bluetooth LE, Class 2 v4.2

Data Logging:

10 second intervals

Environmental Operating Range:

Blü-Test Body: -22 to 158°F (-30 to 70°C)

Temperature 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)

Agency:

CE EN 61326-1:2013 EMC, RoHS, NSF



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.

Specifications subject to change without notice.



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