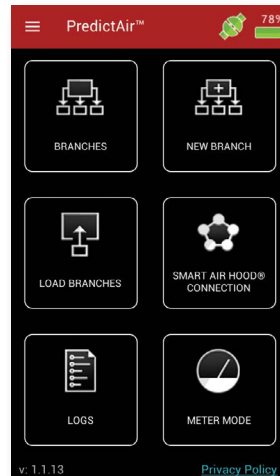# Series SAH SMART Air Hood® Balancing Instrument - PredictAir™ Application Software

Specifications - Installation and Operating Instructions

The **Series SAH SMART Air Hood®** Balancing Instrument is the most accurate air flow hood on the market. With single-user ability, the ergonomic design is light weight and easy to maneuver, with less physical stress, while speeding up the balancing process and reducing costs. Constructed of a rugged polypropylene material, the Hood features Quad Flow Design Technology for controlling air flow and minimizing back pressure, which yields superior measurement accuracy. Featuring Wi-Fi direct communication, with a range of up to 200 yards between the hood and the handheld test instrument.

The SMART Air Hood® Balancing Instrument includes the PredictAir™ Application Software for air flow balancing. Predictive Balancing is a method of predicting the optimal flow set point for each diffuser while balancing the HVAC system. The handheld application software includes algorithms enabling Predictive Balancing to achieve best in class accuracy.

I. SETUP

To be able to update the PredictAir™ Application Software, a Google account must be created so that the application can be updated from Google Play™ store. To properly connect to Google Play™ store a connection to a Wi-Fi network must be established.
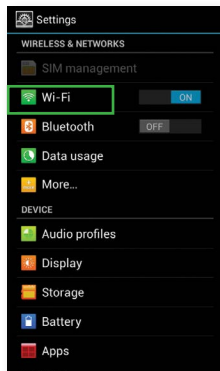
CONNECTING TO A WI-FI NETWORK
First, press the application icon on the home screen (should look similar to the below image).
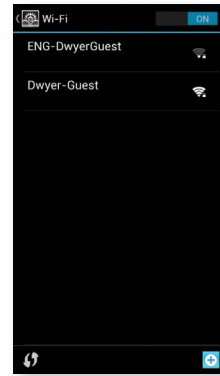
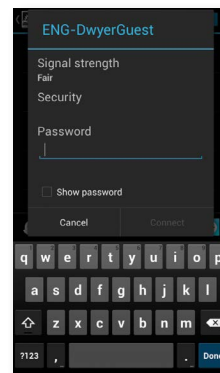

Then find the settings icon and click on it.
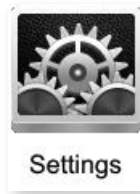
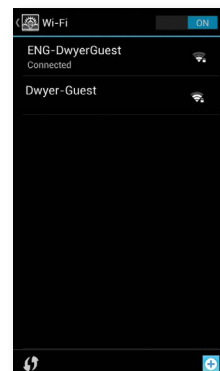Next, press Wi-Fi to enter into the Wi-Fi settings.

Next, choose a local Wi-Fi network to connect to.

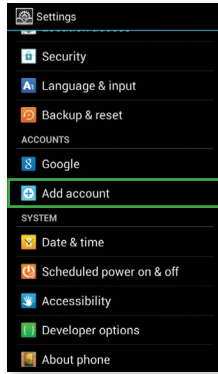Enter in the password to connect to the Wi-Fi access point.

The handheld will now be connected to the Wi-Fi network.

SETTING UP A GOOGLE ACCOUNT
First, go back to main Settings screen and choose the "Add account" option.

Select Google.
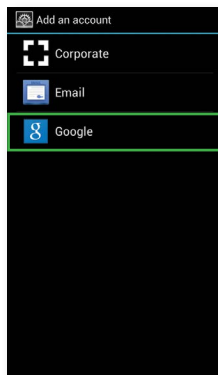
If you have a Google account select "Existing" and enter in your account information to register your Google account to the device.
If you do not have a Google account follow the guide below to add one.

First, press "New" and follow the on screen prompts.
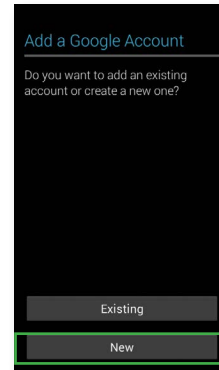
When the account is created you might need to do an authentication check to activate the account. The notice will be in the pull down menu on the device. Press the notification and follow the instructions to activate the account.
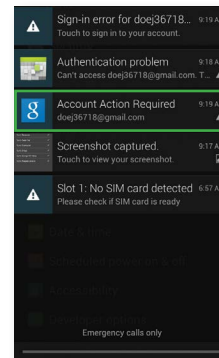
If the account was created correctly the following screen will show your new account.

UPDATING THE PREDICTAIR™ APPLICATION SOFTWARE
Now that a Wi-Fi connection is established and a Google account is tied to the handheld instrument, the Google Play™ store can now be accessed.
Open Google Play™ store from the applications.

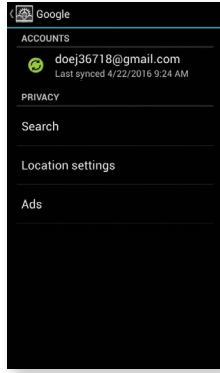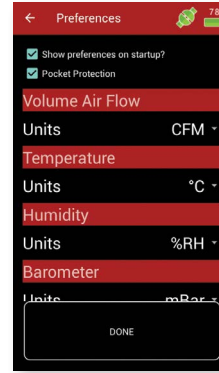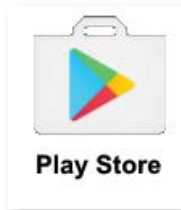Search for PredictAir™ Application Software and press it.

Press the "UPDATE" button to update the application.

The PredictAir™ Application Software should now be up to date.

APPLICATION PREFERENCES
When the application is first opened, the following screen will be shown.

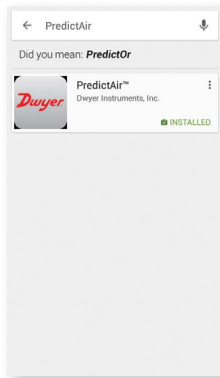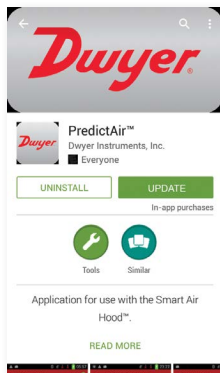**Touch to edit the default units of these fields**

**Touch to save the preferences and go to the app's main page**

The "Show preferences on startup?" checkbox gives the choice for this screen to continue being shown whenever the application is opened. If it's not checked, then the app will open directly to the main screen.

The "Pocket Protection" option prevents unwanted key presses. When activated, if an object covers the screen then the screen will go black and any buttons become inactive. When the object is pulled away from the screen, then the screen will return back to its previous state. This should protect the work from being interrupted when the device is placed in a pocket or other carrying method.

The Preferences can otherwise be located in the main menu by sliding a finger from the left edge of the screen towards the right, pressing the menu button, or pressing the 3 lines at the top of the page and selecting "App Preferences".

CONNECTING TO THE HOOD
Once the handheld instrument is on, open the PredictAir™ Application Software. From the main application screen, press the **SMART AIR HOOD® CONNECTION** button to connect to the air flow hood.
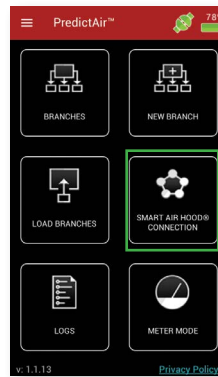
If no paired hoods found

If paired hoods found
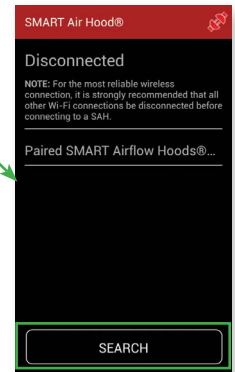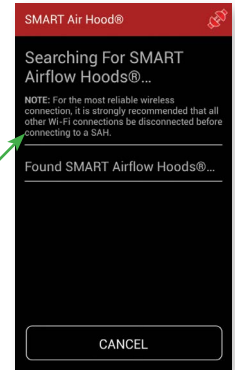
If no paired hoods are found the app will start searching for a hood to allow connection, otherwise press the SEARCH button to search for hoods to allow pairing.

As the app discovers hoods, they will be added to the list under "Found SMART Airflow Hoods".
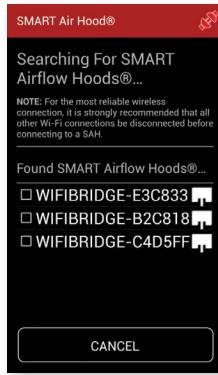
Select the hood that is to be paired. **Note:** More than one line can be selected to pair multiple hoods at the same time.
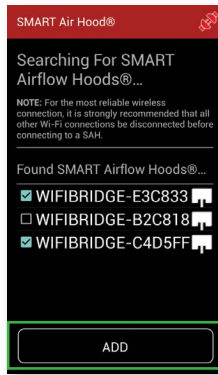
Once the desired hood(s) are selected, press the **ADD** button.

To connect to the desired hood press the hood's name in the Paired SMART Airflow Hoods list. This will bring up a dialog box that allows for the choice to connect, delete, or cancel the action.
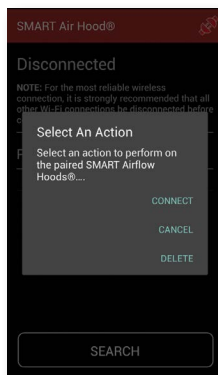
Press "CONNECT" to start the process of establishing the link between the handheld device and the hood. This will bring up a dialog box while the process of establishing the connection is performed. Pressing the cancel or back button will return to the paired screen without establishing a connection.

Once the connection is established, the dialog will automatically close. This will return the application back to the paired devices screen with a green icon and white star (default hood) indicating the hood has been connected to the handheld.
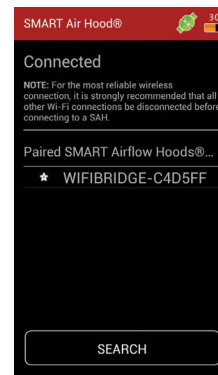
To disconnect from the current hood press on the white star. The Disconnect dialog comes up, which allows for the hood to be disconnected. If "No" is selected, the dialog will be closed without any other action being taken. If "Yes" is selected, the hood will be disconnected, but still paired.
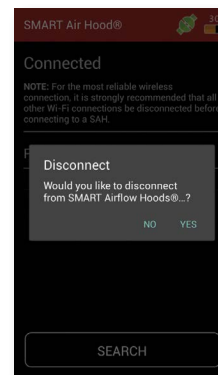
If a different hood is pressed, the Connection dialog box will appear. If "Connect" is selected, the first hood is disconnected and the second hood is connected. If "Delete" is selected, that hood will be removed from the Paired SMART Airflow Hoods list.

IMPORTING A DIFFUSER

Diffusers can be imported to the application by the following instructions.

Load the diffuser into a directory on the device. This has to be a zipped file obtained from the Dwyer Instruments, Inc. website.

Open the PredictAir™ Application Software.

Slide a finger from the left edge of the screen towards the right, press the menu button, or press the 3 lines at the top of the page to open the main menu's options, and select "Import Diffuser List".
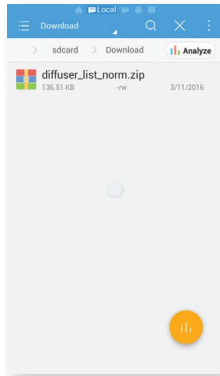
Go to the directory where the diffuser list was put on the handheld instrument.
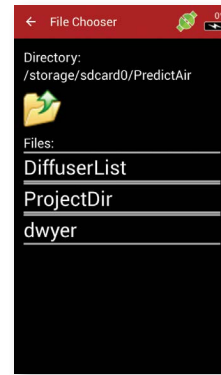
Select the diffuser list to import.
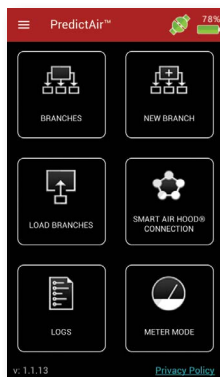
The app will import the diffuser list.
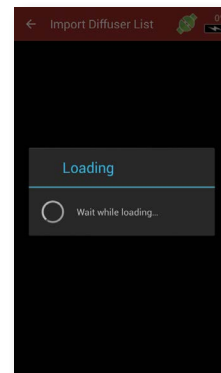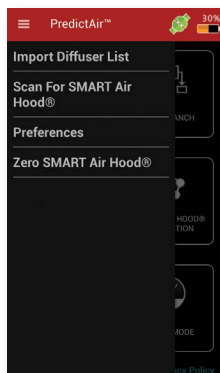
If the diffuser list was set up correctly, and the version is current the app will give the below message. If there isn't a diffuser list loaded, the app will generate a diffuser list.
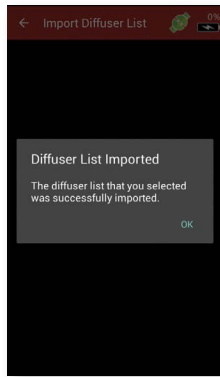
If a hood has not previously been connected or by pressing "Settings", see the previous Connecting The Hood section.
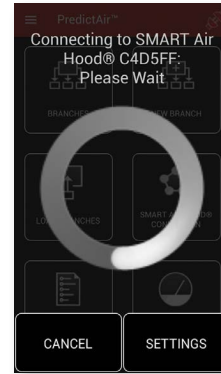
II. METER MODE

To enter Meter Mode in the app, press the METER MODE button from the home screen.
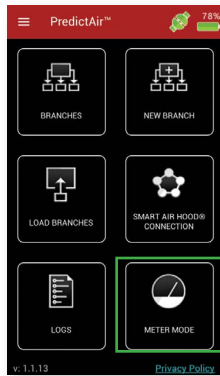
Once a connection has been established, the Meter Mode page will be displayed.

ZEROING THE HOOD
In order for the hood to be zeroed, place it in the desired orientation in which is going to be utilized. Make sure that the hood is blocked so that no air is flowing through it.

For Ceiling Diffusers
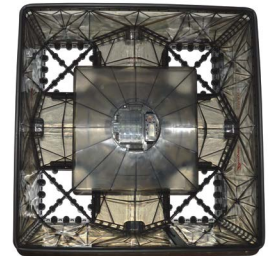
For Side-wall Diffusers

In order to zero the hood, press the three bars at the top of the screen or slide from the left or press the menu button. Press the Zero SMART Air Hood® menu selection to zero the hood.
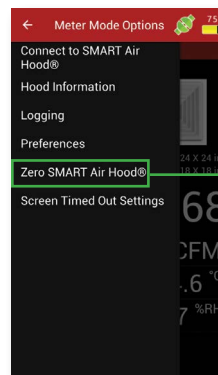
Click the ZERO button. This will begin the zeroing process. When complete, it will show the following screen.

If there is too much air flow for the hood to be zeroed, then the following screen will be displayed. Notice that the zero button is disabled if there is too much air flow.

SELECTING THE DIFFUSER
This screen displays the various readings from the sensors, along with a picture of the diffuser of the register being measured. By tapping on the diffuser, the "Add Edit Register" will be brought up, which allows for the diffuser being measured to be changed.

Click on the diffuser to bring up the list of diffusers and select the diffuser that will be used.

Manual K-Factor
In the case that diffuser being used is not in the downloadable library, but the K-factor of the diffuser is known, the K-factor can be manually entered into the application.

While in meter mode, tap on the diffuser to open the Diffuser list.

Find "Manual Register" in the list and tap on it to open the next screen.
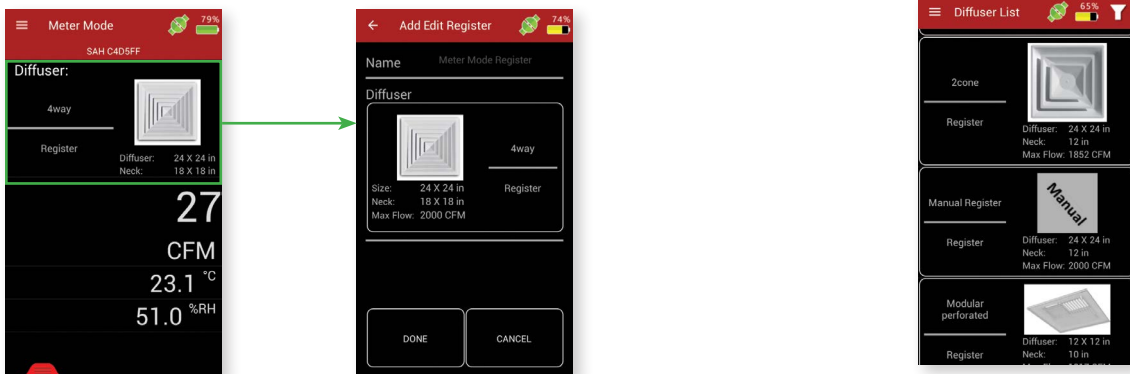
Define it as a Register for supply flow or Return for return flow.
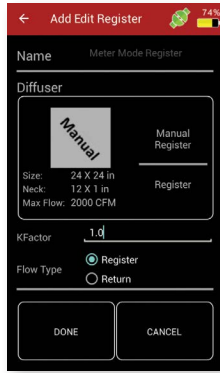
Press on the K-Factor field to enter the K-factor of the diffuser, then press "Done" to return to the Meter Mode screen.

Diffuser Filtering
In the diffuser list you can now filter the diffusers using the filtering tool in the upper right of the diffuser list selection screen.
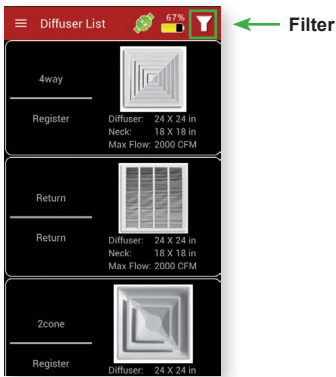
← Filter

When the filter option is selected the filter menu opens. This menu is divided up into four expandable sections.
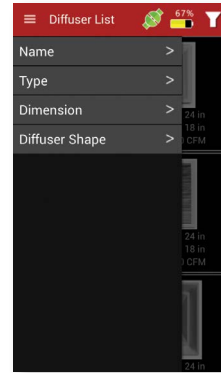
Each section can be expanded to show you options to filter by. **Name** gives all the names of the diffusers so you can sort by one or more names. **Type** gives you the option to sort by "Register" or "Return" types of diffusers. **Dimension** lets you filter by the size of the diffusers. **Diffuser Shape** gives you the option to sort by the diffuser shapes.
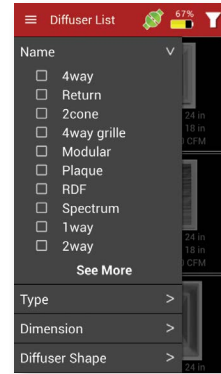
When expanded if there are more than 10 options to filter by an option to "See More" is given. This adds the next 10 filter option in the scrollable list.
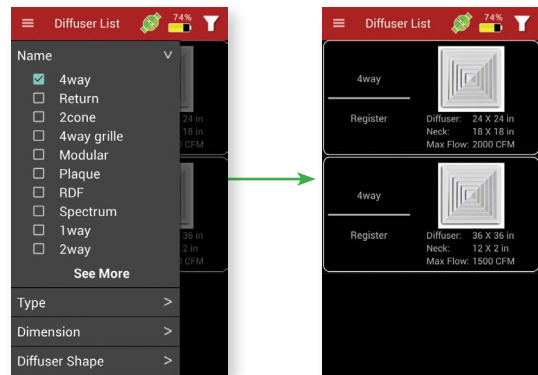
To filter select what options you would like to filter by and close the menu. To remove the filter, open the filter menu and uncheck the filtered options.

PREFERENCES

Logging Preferences

To view the logging preferences, open the drawer menu and select "Logging".
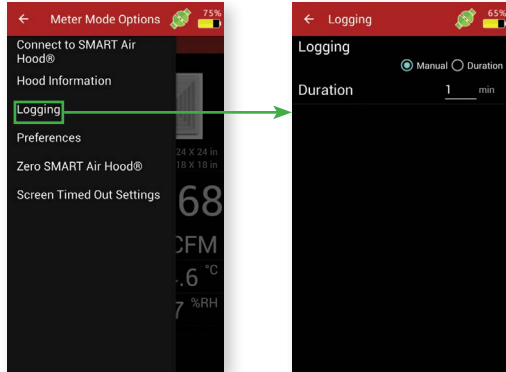
Manual Mode indicates that points will only be logged when the user presses the "LOG" button in Meter Mode. Duration Mode allows for points to be logged every time a value is updated for the next X minutes after the "LOG" button in Meter Mode is pressed.

"Duration" is the number of minutes that data will be logged.

Press the "Back" button or arrow in the upper left to return to Meter Mode.

Hood Information Preferences

To view the hood information, open the drawer menu and select "Hood Information".
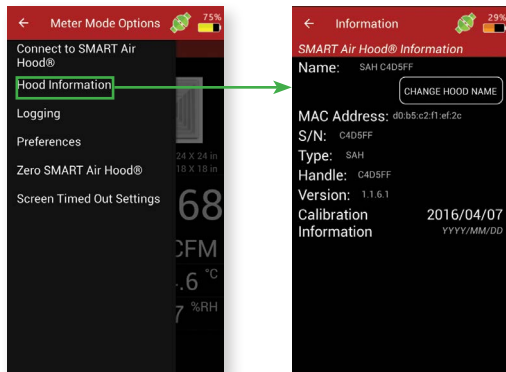
Press the "Back" button or arrow in the upper left to return to Meter Mode.

Sensor Preferences

To view the sensor preferences, open the drawer menu and select "Preferences".

Touch to change units
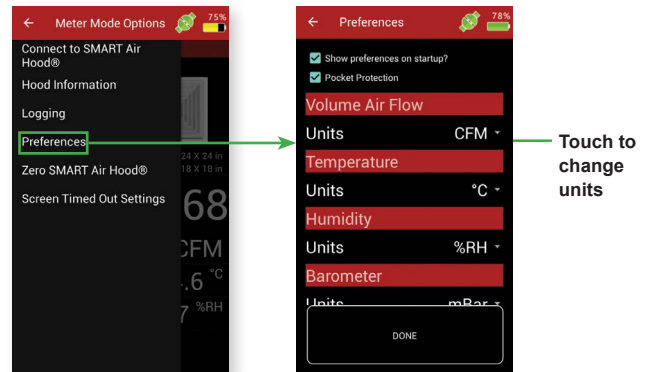
Press the "Back" button or arrow in the upper left to return to Meter Mode.

LOGGING

Log files can be generated from the Meter Mode screen. To start logging, slide up the bottom tab to display the logging tile.
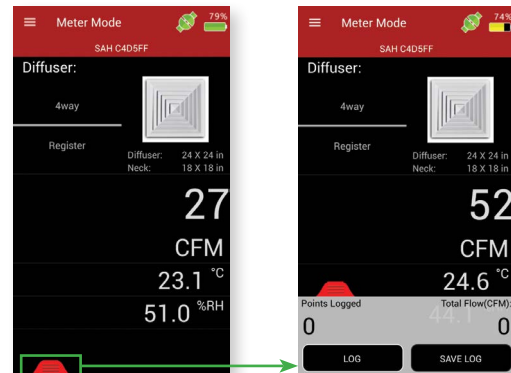
Click the LOG button to start a new log. If the logging is manual (set in Preferences), then only a single point will be logged, otherwise it will log points for the duration stated in Preferences. The "Points Logged" will increase, indicating how many data points exist in the log.

The SAVE LOG button will bring up a dialog with options to continue the current logging session or to save and close the current log.

If the Save Log button is pressed, the dialog box below will appear. If you were in the middle of a duration logging the duration logging would stop and save what was logged.

Name and file path of the log is displayed in text

Touch to close the dialog and return to Meter Mode
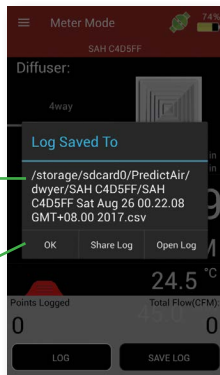
Pressing the "Open Log" button will display the following screen..

This screen displays all the sensors raw data and display data. The raw data is the data created using the default units. The display data is the data after converting the raw data into the selected engineering units. Additional options to interact with the log data are at the bottom of the list of sensors.

The VIEW COMMENTS button will open a text area showing any comments, along with a button that allows for the comments to be edited.

The VIEW HOOD DATA button will switch to a screen that displays the hood information. This provides the hood's version information, name, type, serial number, and sensor information.
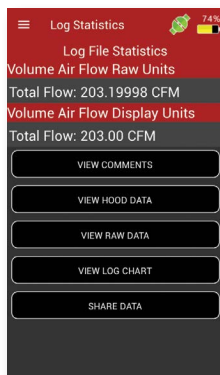
The *VIEW RAW DATA* button will open a new screen that is horizontally scrollable. This screen will show the logged point's raw and display values along with the register and diffuser selected.

Touch to select and unselect rows

The VIEW LOG CHART button will open a chart of the logged points.

The chart area can be zoomed in and out by using two fingers. Double tap will return chart area to default zoom.

Click on the drop down menu to change which sensor is being displayed in the chart.
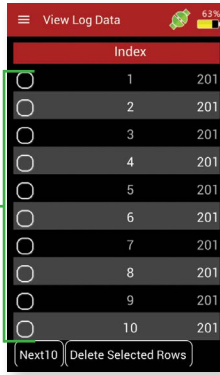
The SHARE DATA button will bring up the hand held instrument's default selection to share data. If no defaults have been chosen, a dialog will be brought up with a set of Android® applications that can handle the resulting activity. (In this case, a way to share the file by either email, saving it to a disk, etc.).
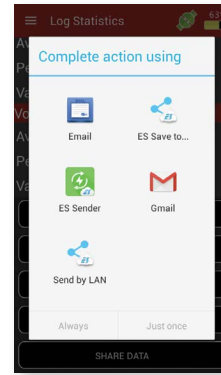
Iii. PREDICTIVE BALANCING

BRANCHES
To access the Branches menu, press the BRANCHES button from the main screen.

Next, click on the desired branch. This will bring up a dialog with the available actions for that branch. If the branch has been previously started, then the following menu will be shown.
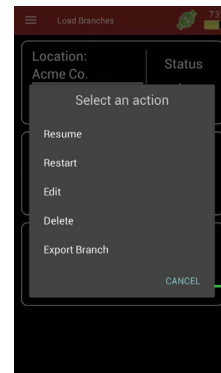
Touch to close window without performing any actions

"Resume" will continue the balancing process at whatever step it was at previously.

"Restart" will start the balancing process from the very beginning where registers are added/edited. This will still retain any registers previously added.

"Edit" will bring up the "Add Edit Branch" screen.
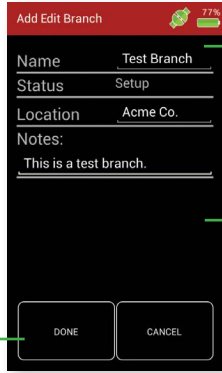
Touch to edit any of these fields except the status field (the app controls this field)

Touch to save any changes made

"Delete" will bring up a dialog asking to confirm the deletion.

"Export Branch" will bring up a file dialog.
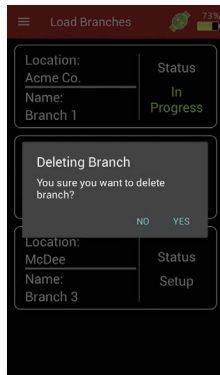
Click on the "File Name" field to enter the file name associated with this branch. This field can't be blank or the below error message will appear. The folder icon with the arrow will navigate up a folder. Folder names do not have extensions and file names will have extensions.
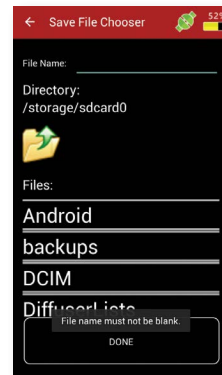
Branches Menu
Sliding a finger from the left edge of the screen towards the right, clicking the menu button, or clicking the 3 lines at the top of the page will open the Branches Menu.
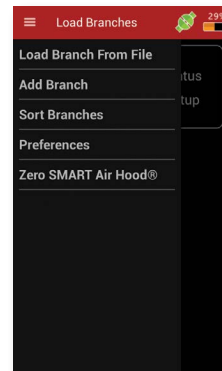
"Load Branch From File" will allow you to select a file to choose which branch to load.

Note: This filters the file names to only show directories or files with the extension ".brc", indicating it is a branch file.

Clicking the branch name loads that branch and adds it to the list of branches. Once complete, the app will be return to the Branches main page with the new branch added to the list.

"Add Branch" will bring up the Add Edit Branch screen allowing addition of another branch.

"Sort Branches" will bring up a dialog that contains the options to sort branches by different methods.

Note that clicking on a branch that has never been started will open the same dialog as editing an existing branch, except for that "Resume" and "Restart" are replaced with "Start". The "Start" option will start the balancing option from the very beginning.

Clicking "Start", "Restart", or if the process was paused while still loading registers, the Load Registers screen will be brought up.

Once a register is added to the list, the register can be long pressed to give some more options.
"Edit" will open the "Add/Edit Register" screen to edit the register.
"Delete" will delete the register.
"Copy" will create a new register that is the same as the long pressed register, but will contain a unique name.
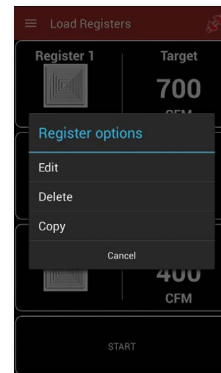
ADD REGISTERS

Since this is a new process, no registers have been loaded. Open the menu by sliding a finger from the left edge of the screen towards the right, clicking the menu button, or clicking the 3 lines at the top of the page. This shows options to modify the registers used in the balancing process for this branch.
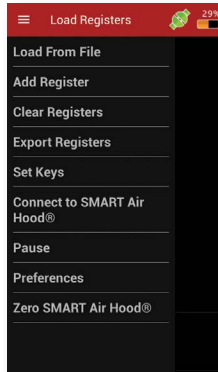
"Load From File" will allow a csv file to be chosen. Note that some of the files might not be a register file, which displays an error if selected.

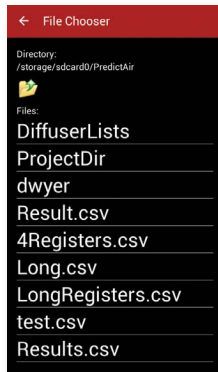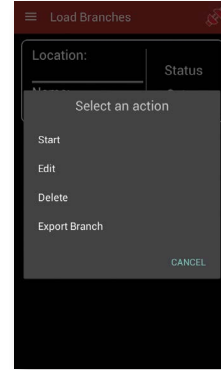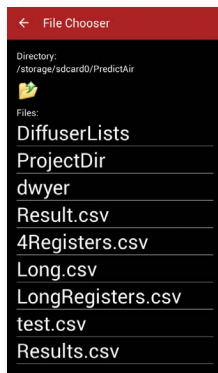"Add Register" will bring up the Add Edit Register screen with nothing filled in except for the default diffuser. As in Meter Mode, if the desired diffuser is not shown, select the manual diffuser to create a diffuser with a known K-Factor.
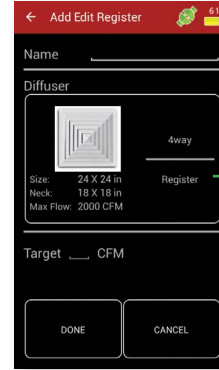
Touch to change diffuser

Clicking either the Name or Target field will bring up a keyboard allowing values to be entered. Note that the register name must be unique. If a register name is entered that is already in the list, the following dialog will be shown.
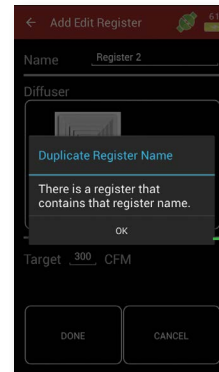
Touch to go back and enter a unique register name

Both the name and the target fields must be filled in to create a register.

"Clear Registers" will erase all the registers in the list for the selected branch.

"Export Registers" will allow the registers to be saved to the handheld instrument. Note that the same dialog will come up asking to overwrite the file if a name is chosen that is already in use.

"Set Keys" will bring up a dialog that allows the selection of which registers are candidates to be the key (checked registers can be the key and unchecked cannot be the key). At least one register must be selected.

BALANCING PROCEDURE

Initial Reading
The START button will start the balancing process. The START button will only be enabled if there are two or more registers in the register list.

The first step of the balancing procedure is to take an initial sweep of all registers within the selected branch with all dampers open.

Touch to check and uncheck registers

Touch to close the dialog and set which registers can be the key

Red indicates that a reading still needs to be taken from the register. After selecting the register to measure it's button will turn from red to white, indicating that it is the active register.
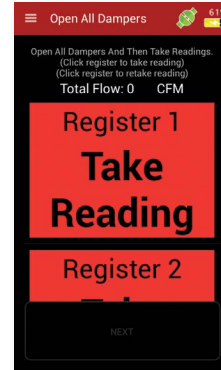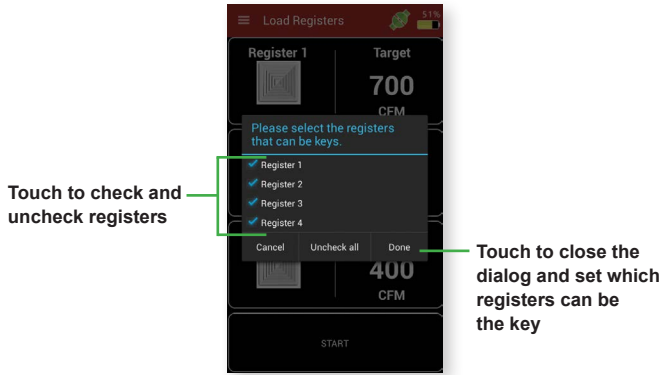
"Pause" will bring up the Pause dialog box along with pressing the Back button.

Touch to save the Register's information and return to the Branches screen

Touch to start the balancing process
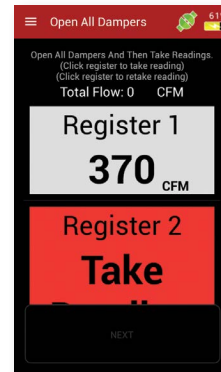
Click register button again to store the reading, at which point it will change from white to green, indicating that a value has been stored for that register.
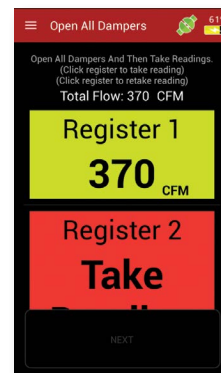
Along with storing the value a total of the air flow is kept at the top next to "Total Flow". This value is the sum of all the registers that are green.

To enter data for a register that cannot be measured by the hood use the "Manually Enter Data" in the slide out menu. A register needs to be selected to enter data manually.
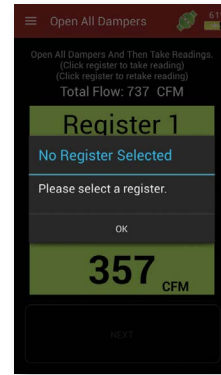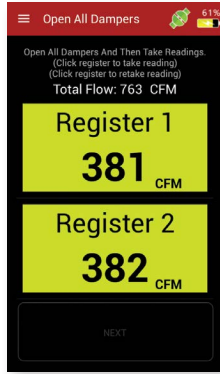
Repeat this procedure until all of the registers have been measured. Clicking on a register again allows for a retaking of that register if needed.

If the slide out menu is opened, the following choices will be shown.

If a register is selected and "Manually Enter Data" is pressed, a dialog will appear that allows for a value to be entered for the register.
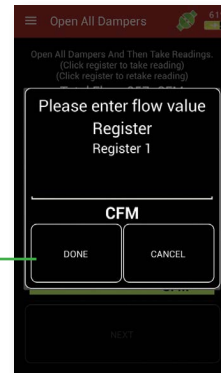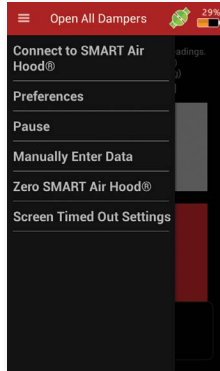
Touch to close the dialog and set the register's value

"Screen Timed Out Settings" allows the hibernate mode to be turned on. If the option is turned on the current screen will hibernate after timing out based on the handheld instrument's hibernate time in the Settings->Display->Sleep setting. If the option is turned off the device will stay awake and not go into hibernation. This is also available on the Initial Reading, Balancing, and Final Reading screens.

Once all of the registers have been measured, the NEXT button at the bottom will become enabled. Press and hold that button until the balance method selection screen appears.

Right now we are going to go into the "Predictive " process right now. Later we will come back to "Proportional" balancing.

Balancing Method Selection

Predictive Balancing
Select the "Predictive " balancing process.
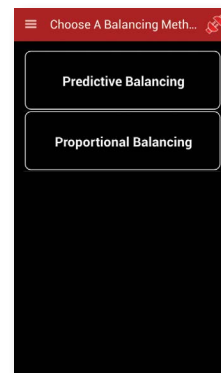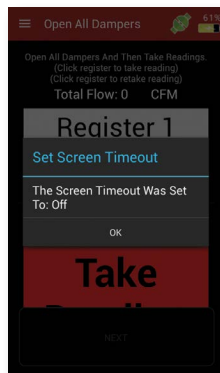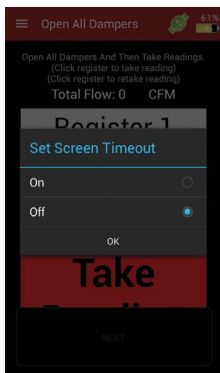
Clicking on the PREDICTIVE button starts the Predictive balancing method, which starts with the Place the Smart Hood dialog box. As shown in the below example, the app will direct you to the register to measure:

Place the SMART Air Hood® on register:

Register 2

57 CFM

OK

Press and hold the OK button to bring up the dialog box asking to confirm that the hood is correctly placed.

Note: Pressing the three lined icon in the upper left of the dialog will open the slide out menu.

Place the SMART Air Hood®

Continue

Are you sure the SMART Air Hood® is in place?

No   Manual Data   Yes

59 CFM

OK

Touch to close the dialog without storing the reading

Touch to close the dialog and take a pre-adjust reading

If the YES button on the hood placement confirmation dialog was pressed the app will bring up the Adjust to Target screen.

≡ Adjust To Target   46%

Adjust the damper to the target.

Register 3

Target: 352 CFM

537 CFM

2 / 10

NEXT

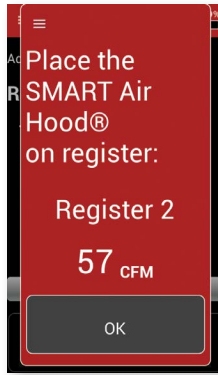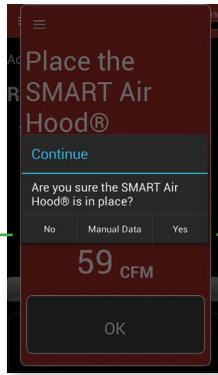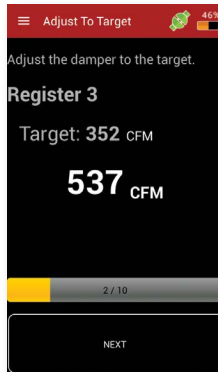"Manual Data" will bring up the Manual Data screen similar to the initial sweep manual entry dialog. After the manual data is entered, another dialog will appear. This manual entry dialog asks for the flow of the register after adjusting (if it can be adjusted). The dialog includes the target flow that the register needs to reach to balance the system.

Please enter air flow value

Register
Register 2

300

CFM

DONE   CANCEL

OK

≡ Adjust To Target   50%

Please enter adjusted air flow value

Target: 155 CFM

Register
Register 2

155

CFM

DONE   CANCEL
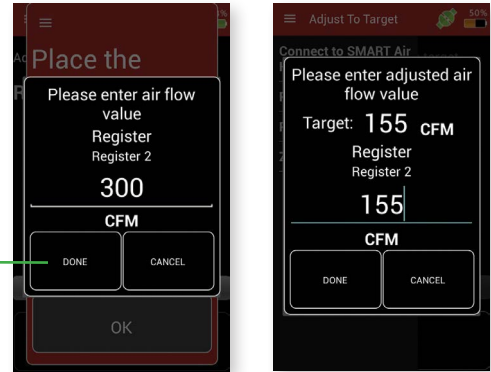
Touch to enter as the adjusted value for that register

If the CANCEL button is pressed, a Pause Balancing screen will be brought up. Pressing the PAUSE button in the pause dialog will store the current location and data within the selected balancing method and return back to the Branches screen.

While in this screen, the damper needs to be adjusted to match the target. Press and hold the NEXT button to bring up the next screen which will guide you to the next register to measure and adjust. Once all registers except the key register are adjusted the app will require a post reading from all the registers. The app will guide you through the post reading process.

The last register measured will be the key register after which the adjust system (shown below) will come up requesting to adjust the branch's flow source to the given target.

≡ Adjust System To Ta...   99%

Adjust system (blower, VAV, etc.) to the target.

Register 1

Target: 424 CFM

437 CFM

9 / 10

NEXT
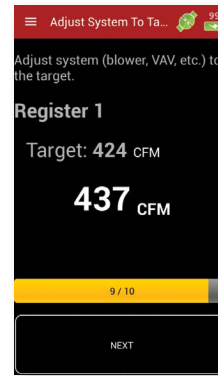
Press and hold to go to the Final Reading screen

On the key reading before getting to the "Adjust System" screen, if the reading taken is within +- 3% of the register's target value you will get a dialog asking if you would like to continue to "Final Reading" or skip to "Final Results".

Skip Final Reading

The error percentage of the key register is 0.1%. Would you like to skip the final readings and continue on to the final results?

No   Yes
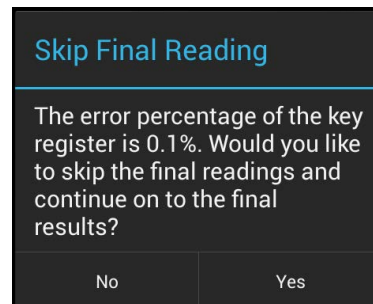
Final Reading

The options and controls of the Final Reading screen are the same as in the Initial Readings screen. This screen is to gather readings to calculate the error ratio of the balancing process which is displayed on the next screen.
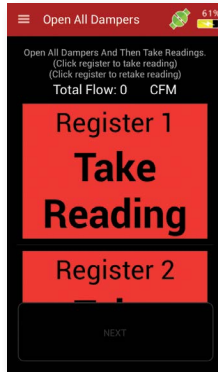
Once all of the registers are measured, Press and hold the NEXT button, to bring up the Final Results screen. This screen displays how accurate the balancing method was.

Key Register

Press and hold to close the display and return to the Branches screen

Press and hold to save the results. It also provides a means to share the results

Final Results Menu
Sliding a finger from the left edge of the screen towards the right, clicking the menu button, or clicking the 3 lines at the top of the page will open the Final Results Menu.
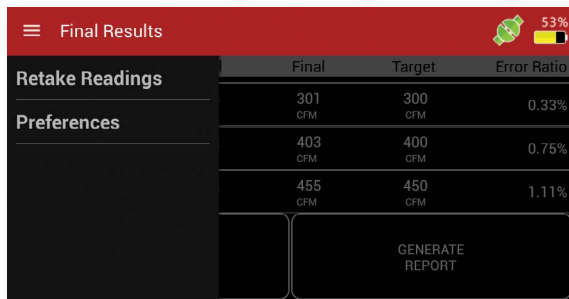
"Retake Readings" will return to the Final Readings screen so that one or more of the register readings can be retaken.

When back in the "Branches" screen the menu when the branch is selected will now have the option "Results" instead of "Resume". "Results" will bring you back to the "Final Results" screen with the previous balancing process's final results.

Proportional Balancing

Proportional balancing allows for the manual balancing of the air system using the SMART Air Hood®. Proportional balancing also provides the ability to log points throughout the process just like in Meter Mode.

Start a branch and continue as above until you get to the "Choose A Method" screen.

Select the "Proportional" balancing method to open up the "Proportional Balancing" screen.

At the top of the screen is one of the registers you added in "Add/Edit Register". Clicking on the register will open the "Register Selection" screen.
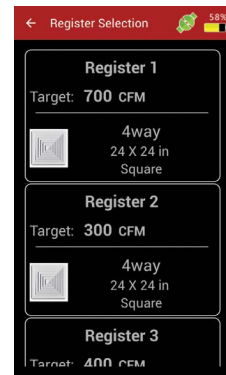
On this screen you can select the current register you are measuring.

The "Log" button at the bottom will start a count of points logged. When a count of logged points is started the "Done" button will become a "Save Log" button. The whole logging works just like the logging in Meter Mode. When the logging button is pressed the total flow counter will add the current flow to the total flow in the lower right above the "Save Log" button.

Proportional Balancing Menu
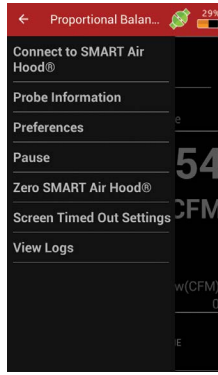
"View Logs" allows you to select a hood and log file to view. This is the same at the "Log Statistics" screen mentioned earlier.

To get back just press the "Back" button until you are back in "Proportional Balancing".

Pressing the "Back" button two times will bring up the "Pause" dialog box to save and pause the balancing process.

Long pressing the "Done" button will bring up a dialog asking if you would like to continue to the "Final Reading" screen or skip to the resul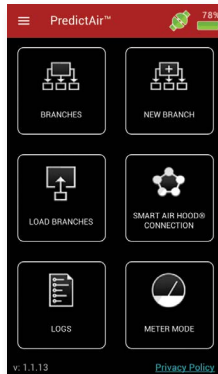ts. Continuing will take you to the "Final Reading" screen to take a last sweep of the registers before the results. Selecting to skip to results will take you to the "Final Results" screen.

PRIVACY POLICY

Selecting "Privacy Policy" on the main screen will display our privacy policy from our web site.

FCC/INDUSTRY CANADA NOTICE

NOTICE 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.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.
• Increase the separation between equipment and receiver
• Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
• Consult the dealer or an experienced radio/TV technician for help.

NOTICE This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:
1. This device may not cause harmful interference;
2. This device must accept any interference received, including interference that may cause undesired operation of the device.

CAUTION Pursuant to FCC 15.21 of the FCC rules, changes or modifications not expressly approved by Dwyer Instruments, Inc. may void the user's authority to operate the equipment.

RF NOTICE

NOTICE This product complies with FCC OED Bulletin 65 and Industry Canada's RSS-102 radiation exposure limits set forth for an uncontrolled environment.

NOTICE This Class B digital apparatus complies with Canadian ICES-003.

⚠ CAUTION The antenna used for this transmitter must maintain a separation of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

AVIS Cet appareil est conforme á Industrie Canada une license standard RSS exonérés (s). Son fonctionnement est soumis aux deux conditions suivantes:
1. Cet appareil ne doit pas provoquer d'interférences,
2. Cet appareil doit accepter toute interférence reçue, y compris les interférences pouvant provoquer un fonctionnement indésirable de l'appareil.

AVIS Ce produit est conforme aux limites d'expositions aux rayonnements définies pour un environnement non contrôlé du Bulletin 65 FCC OET et RSS-102 Industry Canada.

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