

Honeywell Connect Mobile VAV Balancing

USER GUIDE



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ABOUT THIS GUIDE

This guide describes the process to use the Honeywell Connect Mobile VAV Balancing application.

HONEYWELL CONNECT MOBILE APPLICATION

The Honeywell Connect Mobile (HCM) is a mobile application used for VAV balancing. The HCM provides easy access to the Merlin NX IP/ MSTP VAV controller via integrated Bluetooth.

Before connecting with the Honeywell Connect Mobile VAV Balancing App, ensure the Merlin NX IP/ MSTP VAV controller has a strong Bluetooth signal. The BACnet instance ID range allows to discover more controller on the BACnet network.

Features and Benefits

- Supports different types of balancing actions (min - max, setpoint, and other balancing actions)
- Provides a protocol for balancing activities
- Displays BLE signal strength of the controller
- Password protected
- Commands individual and group of VAV controllers
- Easy pairing
- Supports Android and IOS mobile devices.
- Supports local languages (English, Spanish, and Canadian French). The application picks the language based on the device language.

Compatibility

The Honeywell Connect Mobile application is compatible with IOS 13 and above or Android 8 and above.

Honeywell Connect Mobile App



Android Device: Install the Honeywell Connect Mobile app from the Google Play store. Create an account and log in to configure and connect.

iOS Device: Install Honeywell Connect Mobile app from the App store. Create an account and log in to configure and connect.



NOTE:

The user should have atleast 300 MB free space to download and use the mobile application.

CONFIGURING HONEYWELL CONNECT MOBILE

Connecting VAV controllers

1. Open Honeywell Connect Mobile App, select region and click **Sign In**.
Or log in as a **Guest**.

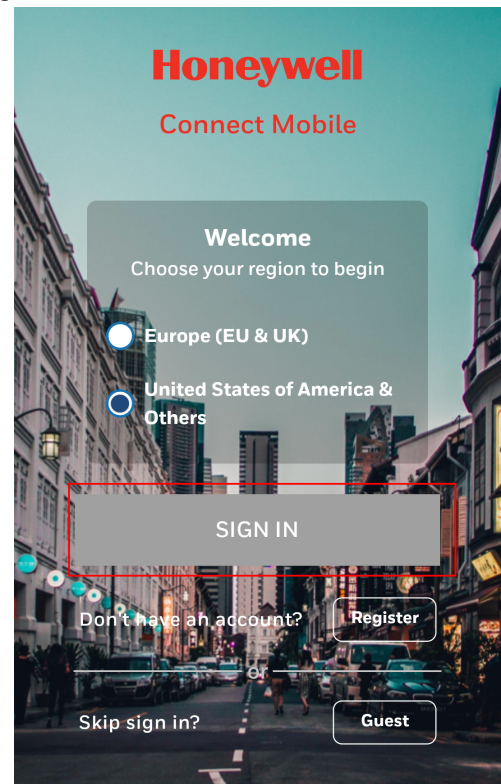


Fig. 1 Honeywell Connect Mobile App Home Page

If you sign in as a **Guest**, the welcome screen displays.

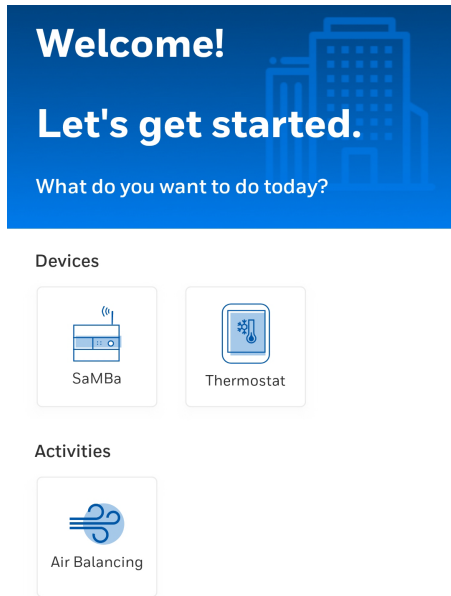


Fig. 2 Welcome Screen

You can change the unit system, airflow measurement, and duct area units in the airflow balancing properties screen.

2. Tap on the desired unit, change the property, and tap **Next**.

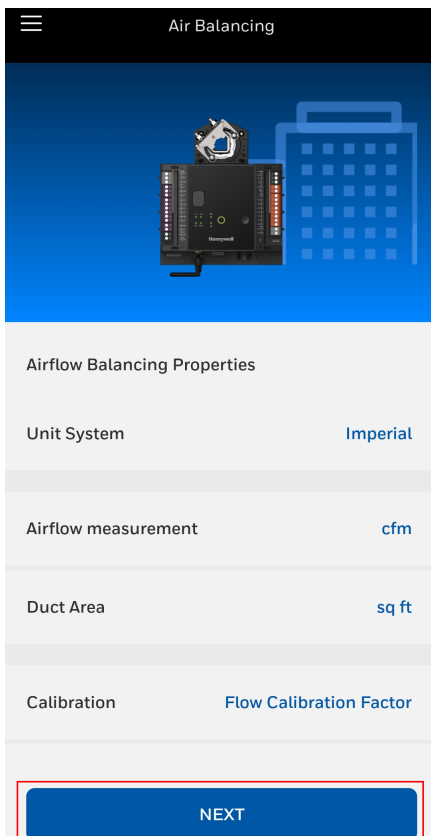


Fig. 3 Airflow Balancing Properties

3. Tap **Connect via Bluetooth**, to connect to the VAV controllers.

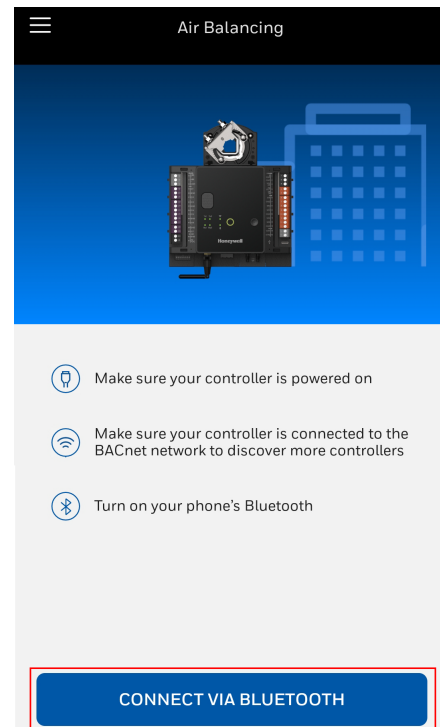


Fig. 4 Connect via Bluetooth Screen

4. Tap the desired discovered controller to connect.

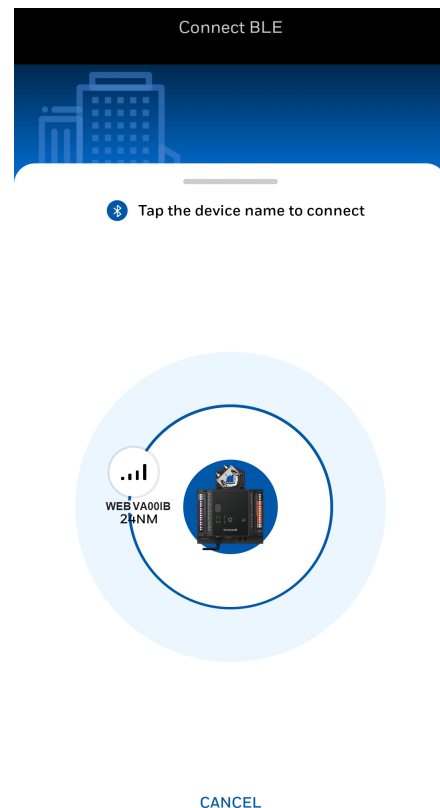


Fig. 5 Discovery Screen

5. Select the **Enter Admin Passcode** and tap **Continue**.

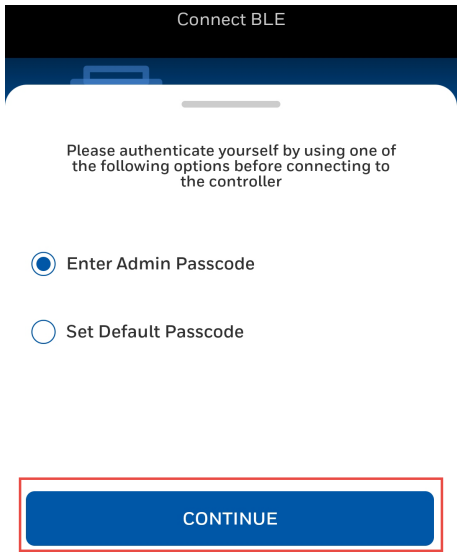


Fig. 6 Authenticate Option

6. Enter the 8 digit passcode and tap **Done**. App verifies the access.

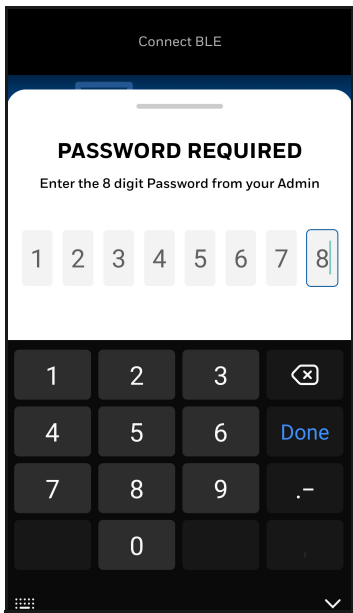
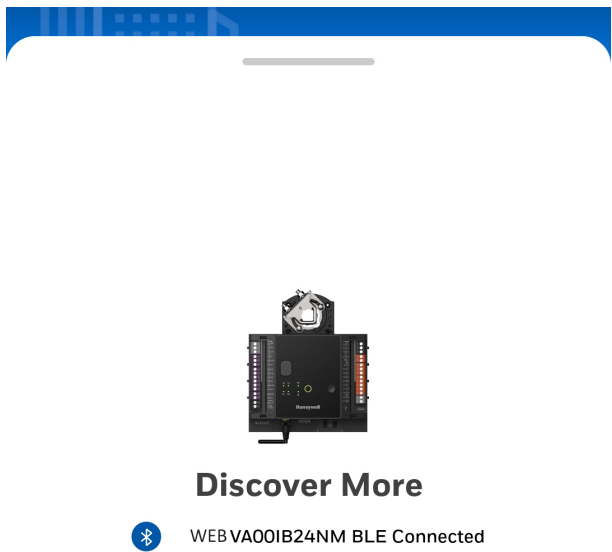


Fig. 7 Authentication Screen

7. Enter the **Instance Range** and tap **Discover** to discover more VAV controllers.



Instance Range

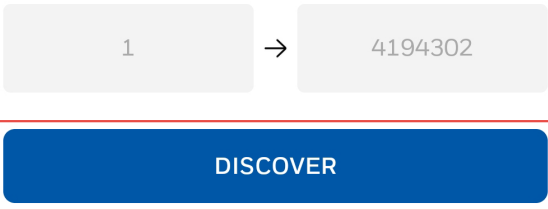


Fig. 8 Instance Range Screen

Connect to multiple VAV controllers

You can discover and connect to multiple MSTP or IP controllers on the Honeywell Connect Mobile application using a Bluetooth connection.

NOTE:

- The device id range entered in the HCM must not include more than 25 MSTP controllers.
- If more than 25 MSTP controllers are discovered, the mobile application will connect to a random group of 25 MSTP controllers.

NOTE:

- The device id range entered in the HCM must not include more than 10 IP controllers.
- If more than 10 IP controllers are discovered, the mobile application will connect to a random group of 10 IP controllers. The high-speed response of the IP controller does not allow the BLE interface to handle more than 10 IP controllers.



IMPORTANT:

It is recommended to use different device id ranges for IP and MSTP controllers.

8. This action discovers all active VAV controllers in the discovery range.
Discovered results are categorized in two sections i.e. balanced and unbalanced.

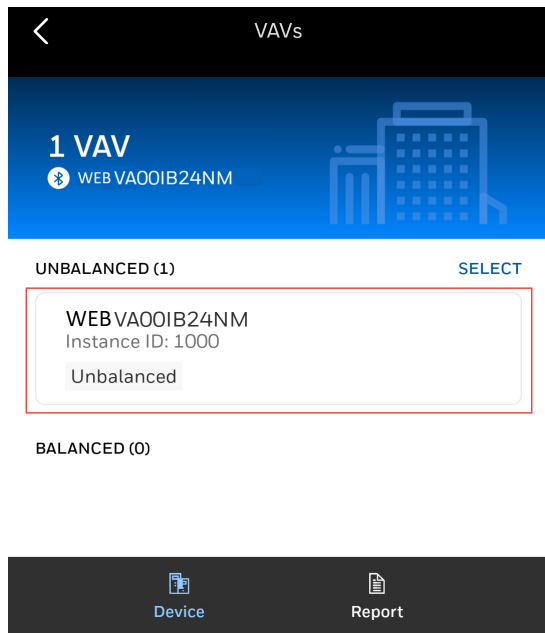








Fig. 9 Discovery Result Screen

PERFORM BALANCING OPERATION

You can perform the following operations in mobile balancing application:

Table 1 Balancing Operations

Balancing Operation	Description
 General	General configuration includes verifying controller properties, configuring balancing properties, and syncing the application from the controller or to the controller. For more details, refer to General Configuration .
 Zero	The zero calibration is performed when the damper is at 0 % and the damper is physically closed. Typically, this task is performed before performing setpoint or max-min balancing. For more details, refer to Zero Calibration .
 Balance	Balancing option includes setting balancing method and configuring the airflow setpoint balancing, max-min balancing and K-factor balancing. For more details, refer to Balance Methods .
 Move	Move option is helpful to balance the airflow across the duct system so that the VAV boxes get adequate airflow for the VAV box, which have been balanced. After performing the setpoint balancing, the new flow calibration factor value is applied to the VAV box. You can perform the move damper operation to verify that the VAV box is calibrated. You can move the damper either by position or airflow. For more details, refer to Move Damper Operation .
 Fan	The fan option can adjust the AHU fan speed if the application in the AHU controller provides the ability to override the fan speed via a BACnet point. You must know the device instance and object instance of the point. For more details, refer to AHU Fan Override option .
 Heat	Based on the VAV controller's application type, the reheat and peripheral heat valve override options are shown or hidden. This feature will be typically used to do water balancing. For more details, refer to Heat Configuration .

General Configuration

General configuration includes verifying controller properties, configuring balancing properties, and syncing the application from the controller or to the controller.

Follow the below steps to perform the general configuration on the selected controller:

- 1. Select a controller from the unbalanced section.
- 2. Tap **General** to view and verify the device instance and model name.

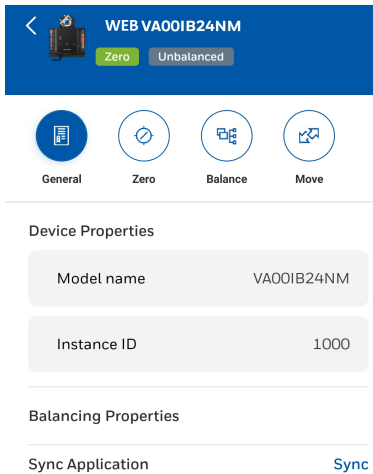


Fig. 10 Controller Property Screen

- 3. Tap **Sync** and select **From Control Application** or **To Control Application**.

- **From Control Application:** It updates the balancing values from controller to the application.
- **To Control Application:** It updates the balancing values from application to the controller.

This action syncs the balancing values. After the sync operation is complete, the controller value gets updated in the balancing application.

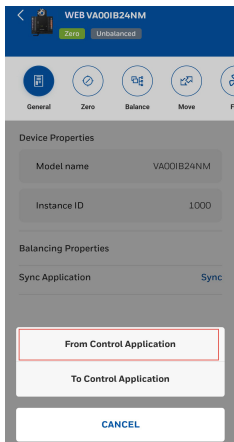


Fig. 11 Application Sync

Configure Balancing Properties

Follow the below steps to configure balancing properties of a controller:

- 1. On the **General** screen, click **Balancing Properties**.

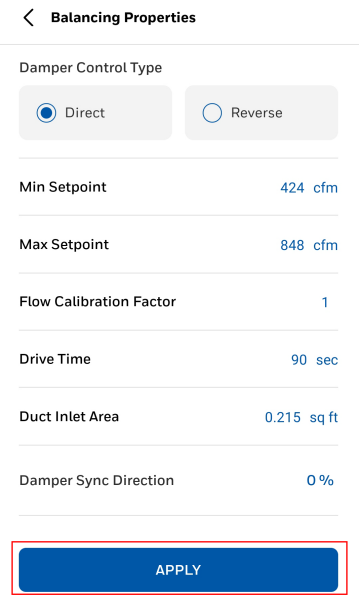


Fig. 12 Balancing Properties Screen

- **Damper Control Type:** Select the direction in which the damper must rotate, **Direct** or **Reverse**.
- **Min Setpoint:** Enter the minimum airflow value that must be supplied.
- **Max Setpoint:** Enter the maximum airflow value that must be supplied.



NOTE:

The max setpoint value must not exceed the maximum airflow value of the VAV box.

- **K-Factor:** Enter the flow K-factor value. Default K-factor value is 1.
- **Drive Time:** Enter the maximum time taken by the actuator to drive the damper from 0 % to 100 % open state.
- **Duct Inlet Area:** The dimensions are provided by the VAV manufacturer. You can also measure the dimensions manually.
- **Damper Sync Direction:** Select the sync direction of 0 % to 100 %. The actuator will sync the damper from 0 % to 100 % position according to the option selected. This will happen automatically one time before any balancing operation.

- 2. After performing desired changes, tap **Apply**.

Zero Calibration

The zero calibration is performed when the damper is at 0 % and the damper is physically closed. Typically, this task is performed before performing setpoint or max-min balancing.

Follow the below steps to perform the zero calibration:

1. Tap **Zero** to view and verify the controller **Current Sensed Airflow** and **Current Damper Position**.

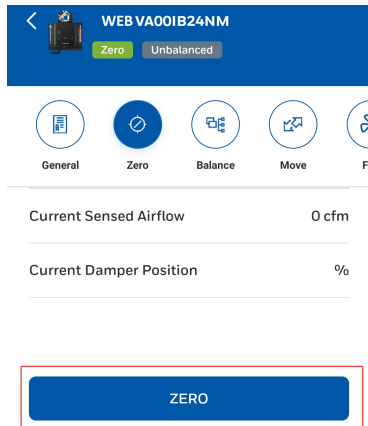


Fig. 13 Zero calibration

2. Tap **Zero** to move the damper to zero.

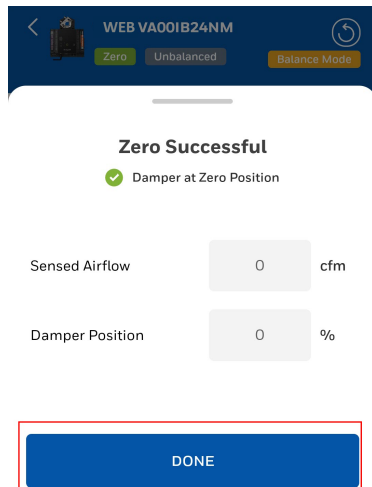


Fig. 14 Zero calibration Successful Status

3. Tap **Done**.

Balance Methods

Balancing methods include configuring the balancing method and configuring the airflow setpoint balancing, max-min balancing, and K-factor balancing.

Follow the below steps to perform balancing configuration:

1. Tap **Balance Method**, to select a balancing method.
 - [Method 1: Airflow Setpoint Balancing](#)
 - [Method 2: Max-Min Balance](#)
 - [Method 3: Calibration Factor Balance](#)

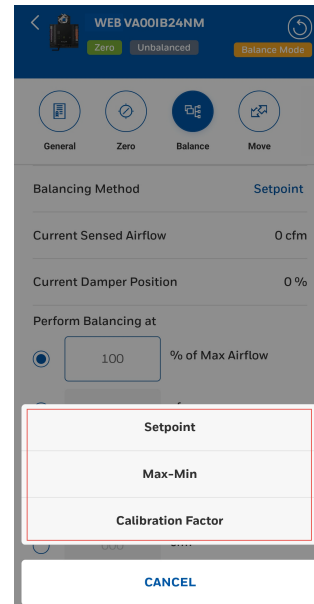


Fig. 15 Balancing Methods

Method 1: Airflow Setpoint Balancing

The setpoint balancing is used to balance and measure the flow calibration factor with the VAV box for a fixed airflow value.

- You can provide the percentage (%) maximum airflow setpoint or an airflow value to be achieved by the VAV box.



NOTE:

The maximum airflow setpoint value is configured in the balancing properties window, refer [Configure Balancing Properties](#).

- You can set the percentage (%) of error tolerance for the target airflow or the airflow value.

For example, if the setpoint is set to 500 cfm and the error tolerance is set to 10 cfm, the tool considers the airflow in the stabilized state when it senses airflow between 490 - 510 cfm. After performing the setpoint balancing, the new flow calibration factor value is applied to the VAV box.

You can perform the [Move Damper Operation](#) operation to verify the VAV box calibration.

Follow the below steps to perform the airflow setpoint balancing:

- 1. Tap **Balance** and select **Setpoint** balancing method.
- 2. Enter the value in the **% of Max Airflow** field and **Error Tolerance** value in terms of percentage or cubic feet per meter (cfm).
- 3. Tap **Start Balancing**.

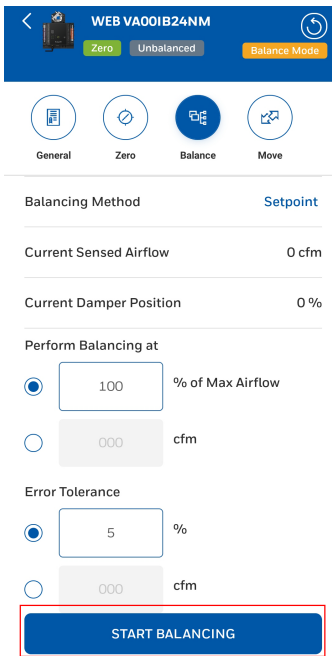


Fig. 16 Setpoint Balancing Property

- 4. Enter **Measured Airflow** value and tap **Apply**.

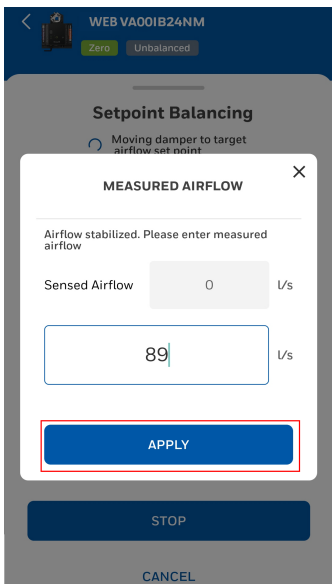



Fig. 17 Measured Airflow value


Setpoint balancing successful screen appears with the new K factor.

- 5. Tap **Done**.

**NOTE:**
When performing a setpoint balancing from the VAV mobile application, the LED pattern changes from solid green to red / green / yellow cycles which indicates an empty controller.

Method 2: Max-Min Balance

The max-min balancing is used to balance the VAV boxes for two different air flow setpoint values.

**IMPORTANT:**
It is recommended to perform min balancing before the max balancing.

You can either set the tolerance in form of percentage of target airflow or the airflow value. For example, if the max airflow is set to 500 cfm and the error tolerance is set to 10 cfm, the tool considers the airflow is in a stabilized state when it senses airflow between 490 - 510 cfm.

After performing the max-min balancing, you can perform the [Move Damper Operation](#) operation to verify the VAV box calibration.

Min Balance Method

Follow the below steps to perform the min balancing:

- 1. Tap **Balancing** and select **Max-Min** balancing method.
- 2. Select **Min Balancing** option, enter the **Error Tolerance** value in terms of percentage or cfm, and tap **Start Balancing**.

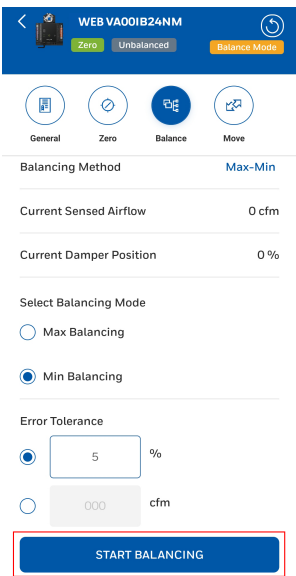


Fig. 18 Min Balancing Property

3. Enter **Sensed Airflow** value and tap **Apply**.

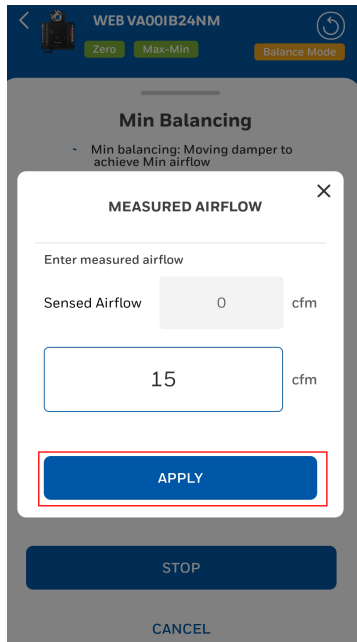


Fig. 19 Measured Airflow Value

4. Tap **Yes, Start**. After achieving target airflow, **Max-Min Balancing Successful** screen appears.

5. Tap **Done**.

Max Balance Method

Follow the below steps to perform the max balancing:

1. Tap **Balance** and select **Max-Min** balancing method.
2. Select **Max Balancing** option, enter the **Error Tolerance** value in terms of percentage or cfm, and tap **Start Balancing**.

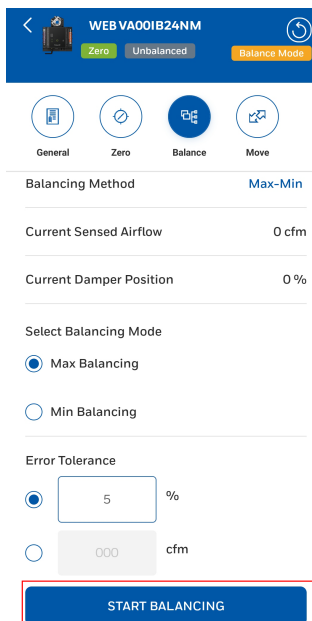


Fig. 20 Max Balancing Property

3. Enter the **Sensed Airflow** value and tap **Apply**.

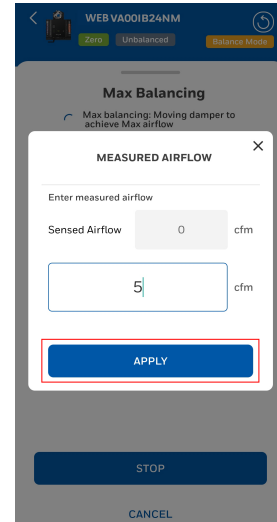
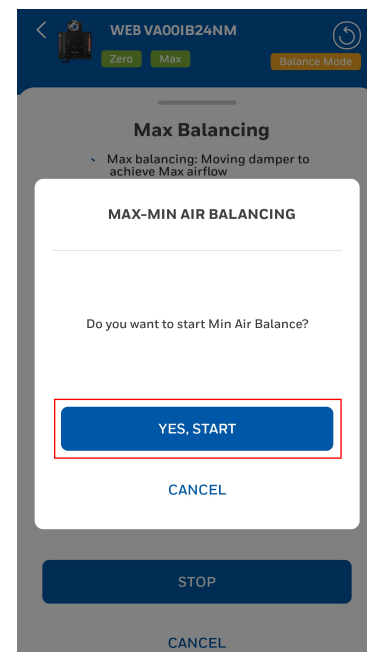


Fig. 21 Measured Airflow Value

4. Tap **Yes, Start**. After achieving target airflow, the **Max-Min Balancing Successful** screen appears.



5. Tap **Done**.

Method 3: Calibration Factor Balance

After performing the setpoint balancing for a VAV box, the calculated flow calibration factor of that VAV box can be manually applied to other VAV boxes connected at the site.

This is possible only if the VAV boxes have similarities with each other in terms of the duct area, maximum airflow capacity of the VAV boxes, damper type, and room size.

NOTE:
The **New Calibration Factor** can be entered manually if you know the values.

Follow the below steps to perform the calibration factor balancing:

- 1. Tap **Balance** and select **Calibration Factor** balancing method.
- 2. Tap **Set Calibration Factor**.

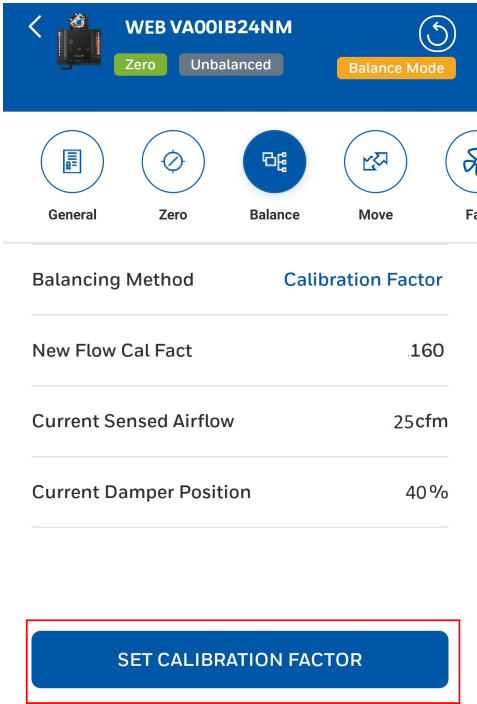


Fig. 22 Calibration Factor Property

- 3. Enter the **Calibration Factor** value and tap **Save**.

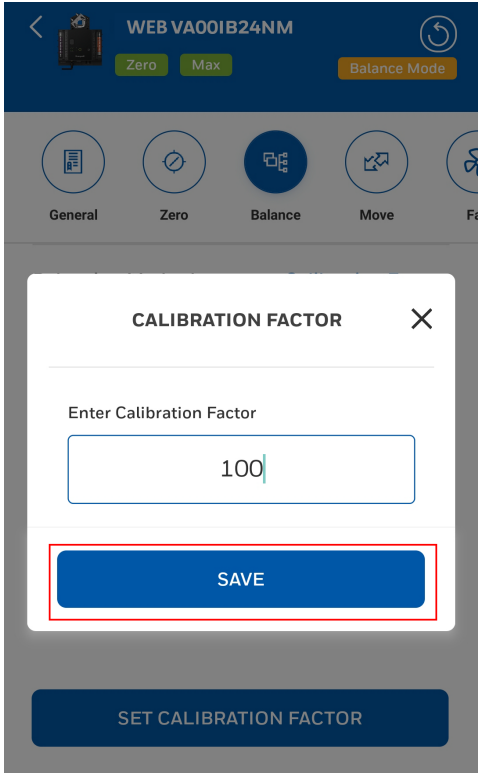


Fig. 23 Calibration Factor Value

- 4. Calibration value updated screen appears.

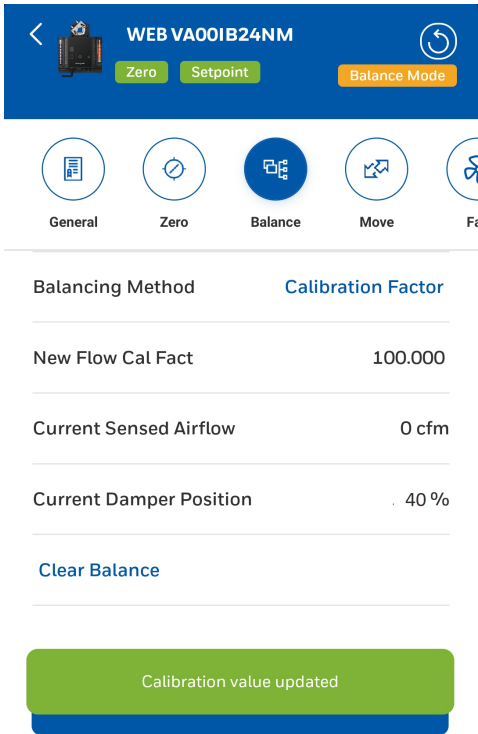


Fig. 24 Calibrated Value Screen

Move Damper Operation

Move option is helpful to verify the VAV box has been calibrated correctly. This is performed by moving the damper to a specified airflow setting or damper position.

After performing the setpoint balancing, the new flow calibration factor value is applied to the VAV box. You can perform the move damper operation to verify if the VAV box is calibrated correctly. You can move the damper either by position or airflow.

Follow the below steps to perform the move configuration:

1. Tap the **Move** option

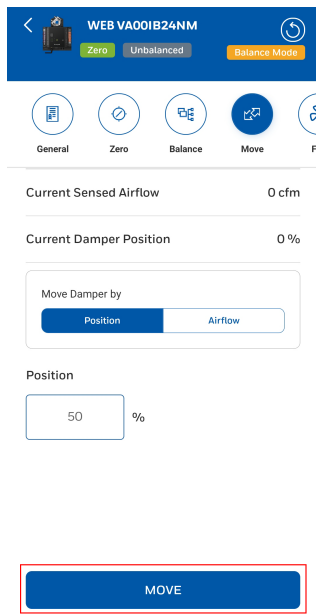


Fig. 25 Move Damper Configuration Screen

2. Select one of the following methods to move the damper:

- Move Damper by Position:** Move the damper to a defined position. Enter target position of the Damper in position field to move the damper to the required position. For example, if you type 50, the damper will move from its current position (0 % as per screen) to the targeted 50 % position.

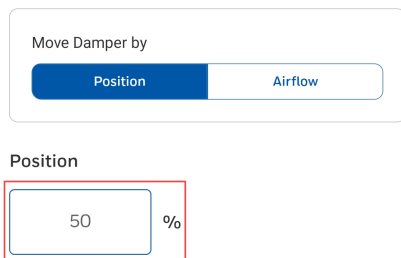


Fig. 26 Move Damper by Position

- Move Damper by Airflow or Error Tolerance:** Move the damper to achieve the specified airflow.

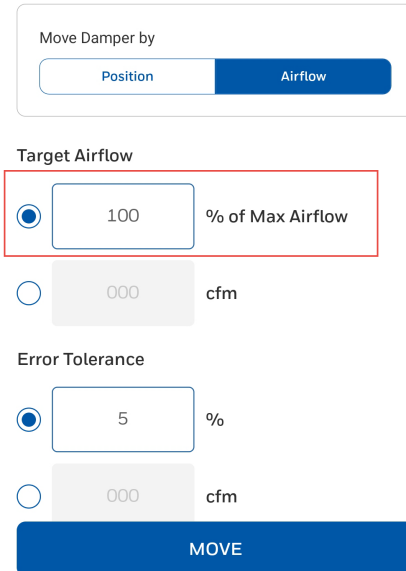


Fig. 27 Move Damper by Airflow

- Tap **Move** to move the damper as per selected position or airflow.
- Tap **Done** to apply the changes.

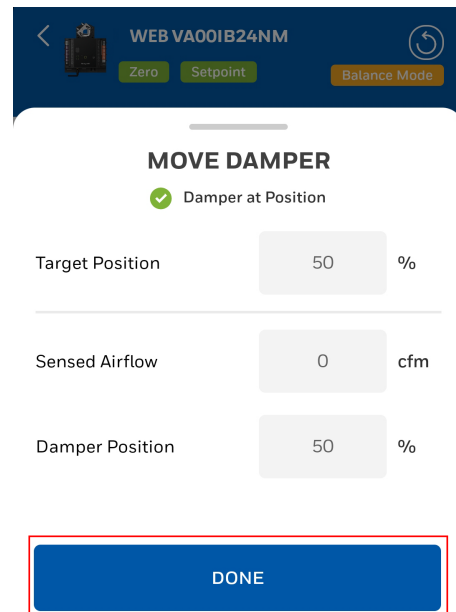


Fig. 28 Damper Position

AHU Fan Override option

The fan override option can adjust the AHU fan speed if the application in the AHU controller provides the ability via a BACnet point. The user must know the device instance and object instance of the point.

Follow the below steps to perform the fan override option:

- 1. Tap **Fan** option.

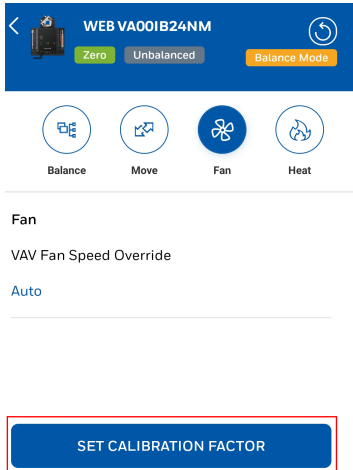


Fig. 29 Fan Override Screen

- 2. Tap **Set Calibration Factor** and select **Auto** or **Override**.

Select **Auto** to set the reheat coil automatic or select **Override** to manually set override value (0 - 100 %). For staged fan or single speed fan, you can command to the appropriate state to turn on or off the fan stage(s).

- 3. Tap **Apply**. Updated controller property appears on the screen.

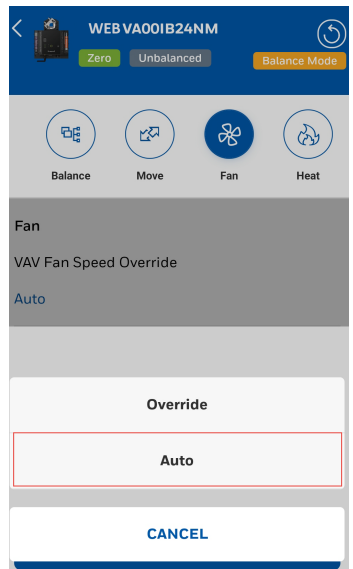


Fig. 30 Fan Override Option

Heating Coil Balancing

Based on the VAV controller's application type, the reheat and peripheral heat valve override options are shown or hidden. This feature will be typically used to do water balancing.

Follow the below steps to perform the heating coil balancing:

- 1. Tap the **Heat** option.

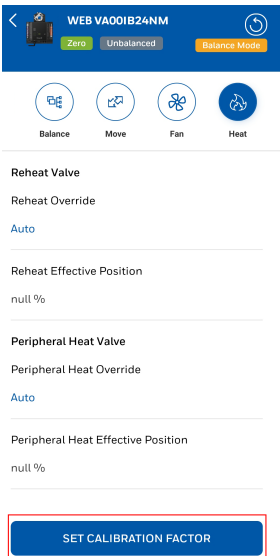


Fig. 31 Heat Balancing Screen

- 2. Tap **Set Calibration Factor** and select **Auto** or **Override**.

Select **Auto** to set the reheat coil to automatic control. Select **Override** to manually set reheat coil position value (0 - 100 %). The Reheat Effective Position is read-only. The value will be blank if the effective position BACnet point is not available in the application.

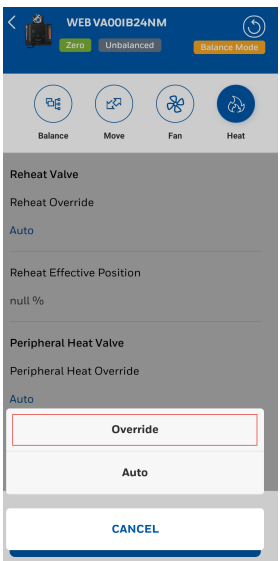


Fig. 32 Heat Override Option

3. Tap **Reheat Override** and enter the override value (0 – 100 %)
4. Tap **Peripheral Heat Override** and enter the override value (0 – 100 %)
5. Click **Apply**. Updated controller property appears on the screen.

Resume To Normal

After completing the balancing procedures for the VAV, it is necessary to change balancing mode to normal mode.

Follow the below steps to resume to normal mode:

1. Tap on the resume icon.

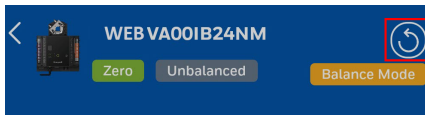


Fig. 33 Resume Icon

2. Tap **Yes, Resume To Normal**.

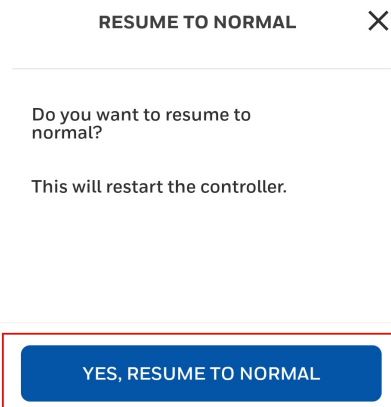
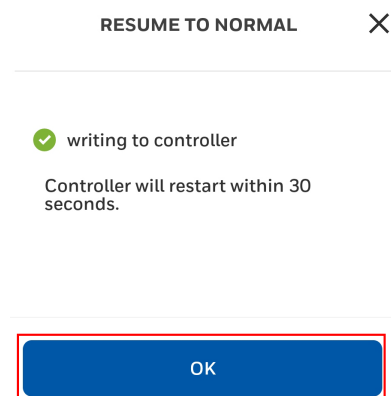


Fig. 34 Resume To Normal Mode

The controller will restart and return to the normal mode.



3. Tap **Ok**.

Balancing Multiple Controllers

You can perform the following operations on multiple controllers.

- [Moving Damper](#)
- [Balancing Multiple Controllers](#)
- [Zero Balancing On Multiple Controllers](#)

Moving Damper

You can move the damper for multiple controllers to a specified position.

Follow the below steps to move damper of multiple controllers:

1. On the discovery screen, tap the **Select** option.

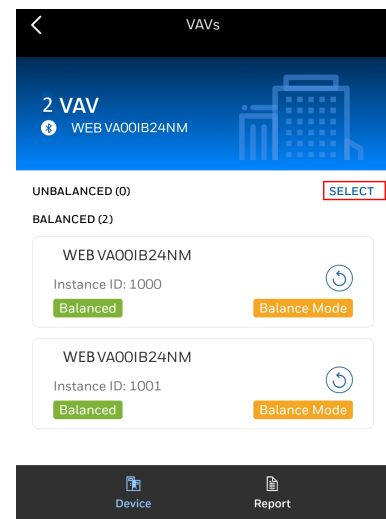


Fig. 35 Controller List

2. Tap the discovered controllers or tap **Select All** to select multiple controllers.
3. Tap **Next**.

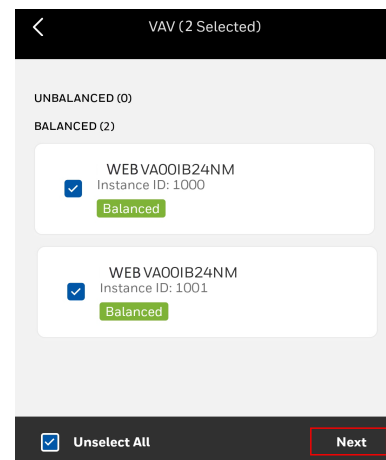


Fig. 36 Controller Selection

4. Tap the **Move** option to move the damper to new position.

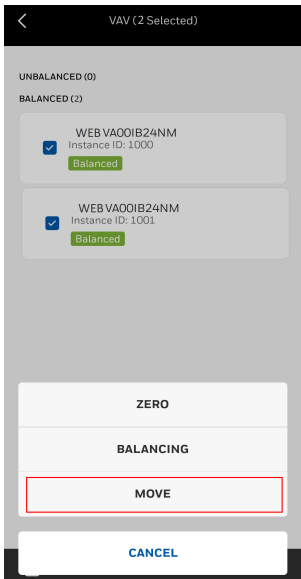


Fig. 37 Move Option

5. Read the message and tap **Yes, Continue**.

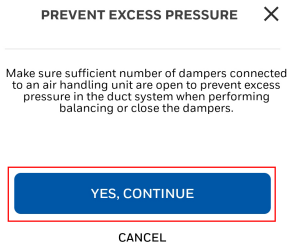


Fig. 38 Prevent Excess Pressure Message

6. Select one of the following methods to move the damper:
- **Using Position:** Move the damper to a defined position. Enter target position of the Damper in position field to move the damper to the required position.
 - **Using Airflow:** Move the damper to achieve the specified airflow. Enter the target airflow and error tolerance.

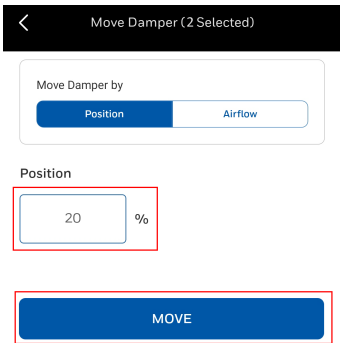


Fig. 39 Move Damper Option

7. Tap **Move** to move the damper to target position.

Wait for few minutes to complete the damper operation.

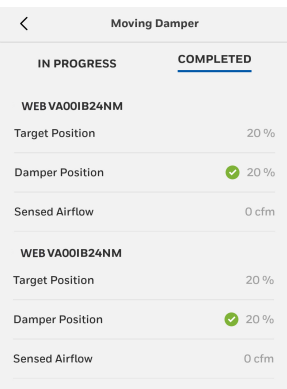


Fig. 40 Moving Damper Status

Balancing Multiple Controllers

You can balance multiple discovered controllers. Follow the below steps to balance multiple controllers:

1. On the discovery screen, tap **Select**.

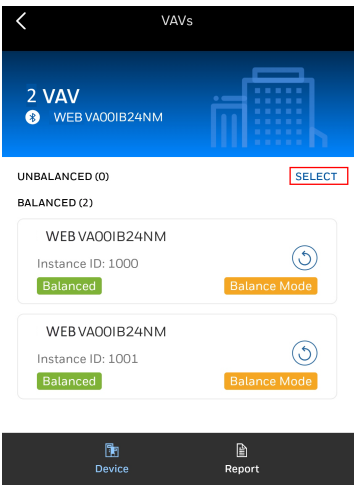


Fig. 41 Controller List

2. Tap the discovered controllers or tap **Select All** to select multiple controllers.
3. Tap **Next**.

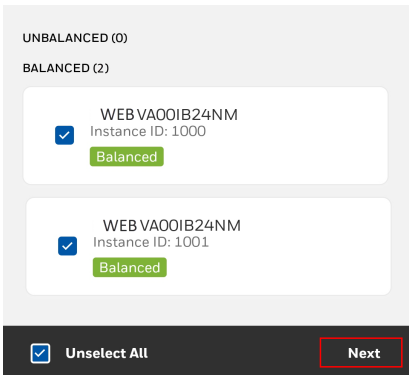
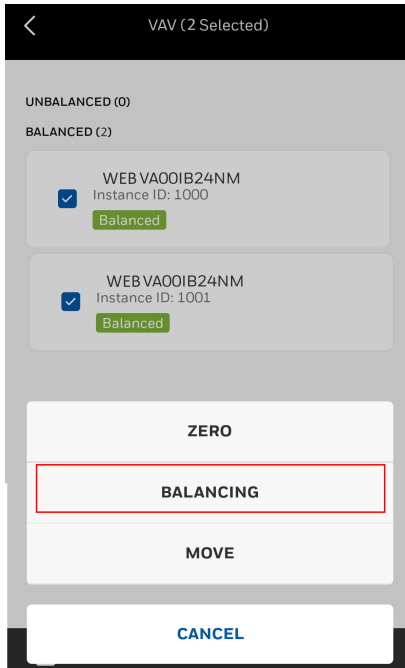


Fig. 42 Controller Selection

4. Tap the **Balancing** option. The Balancing screen



appears.

Fig. 43 Balancing Option

5. If you want to change balancing properties of the controller, tap **Balancing Properties**, change the properties and tap **Apply**.
6. Set the **Balancing Method** and tap **Start Balancing**. For more details, refer to [Balance Methods](#).
7. Read the message and tap **Yes, Continue**.

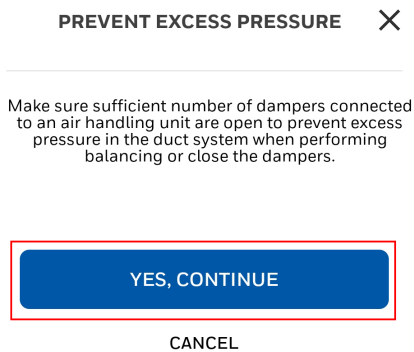


Fig. 44 Prevent Excess Pressure Message

Wait for a few minutes to complete the balancing operation.

Zero Balancing On Multiple Controllers

Follow the below steps to perform zero balancing on multiple controllers:

1. On the discovery screen, tap the **Select** option.
2. Tap the discovered controllers or tap **Select All** to select multiple controllers.
3. Tap **Next**.

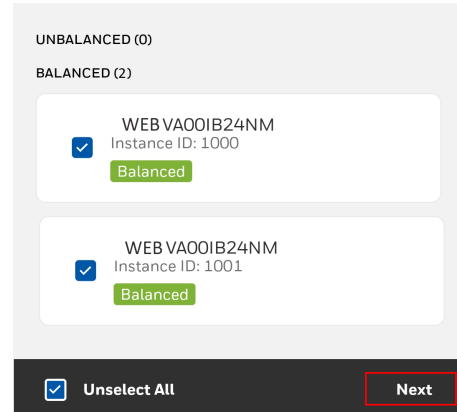


Fig. 45 Controller Selection

4. Tap the **Zero** option to move the damper according to position or airflow.

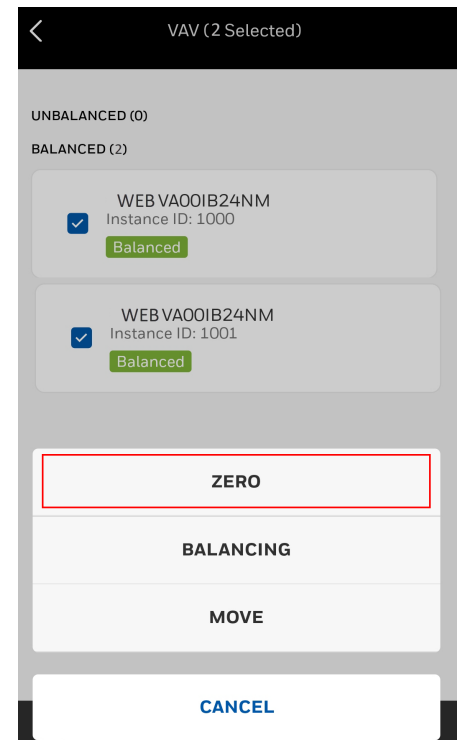


Fig. 46 Zero Option

5. Read the message and tap **Yes, Continue**.

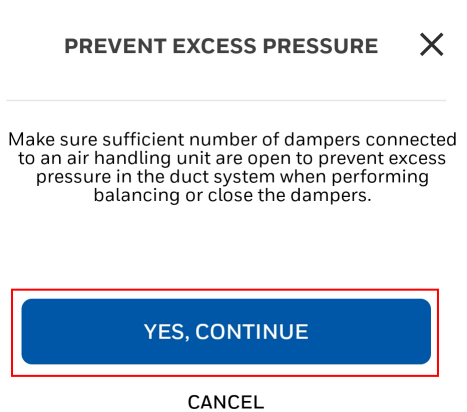


Fig. 47 Prevent Excess Pressure Message

Wait for a few minutes to complete the zero balancing operation.

Generating Balance Report

The VAV balancing application allows to generate a balancing report. After performing the balancing on all VAV controllers, the T & B contractor can generate a final report.

Follow the below steps to generate balancing report:

1. On the discovery screen, tap the **Report** option.

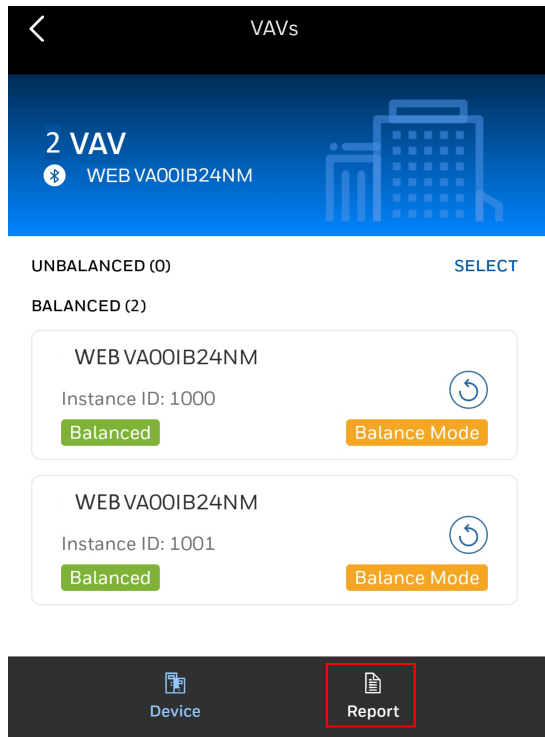


Fig. 48 Controller List

2. Tap the discovered controllers or tap **Select All** to select multiple controllers.

3. Tap **Generate Report**.

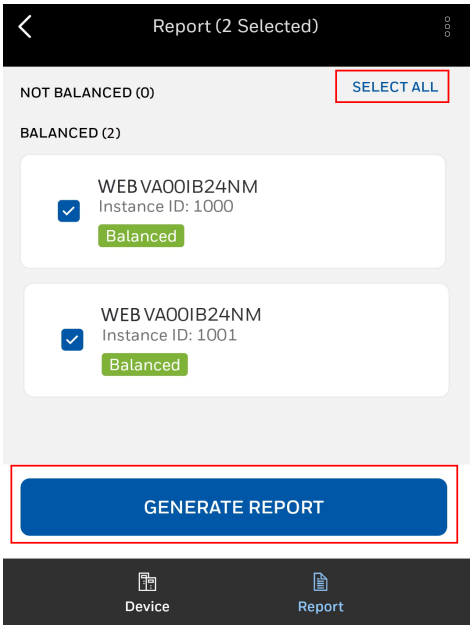


Fig. 49 Controller Selection

4. Enter the **Report name** and **Description** and tap **Generate Report**.

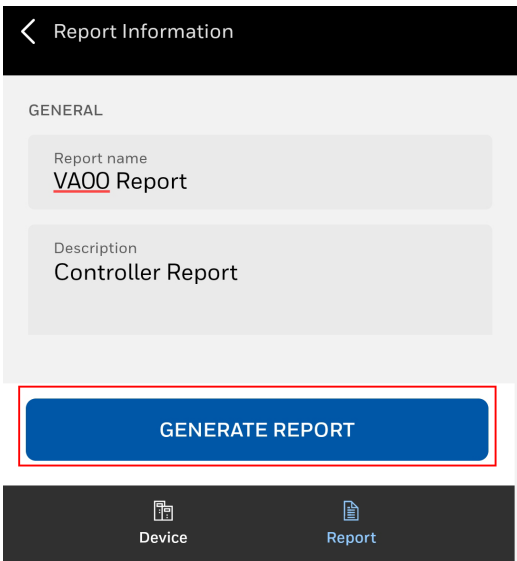


Fig. 50 Generate Report

5. Select the csv report and share the report.

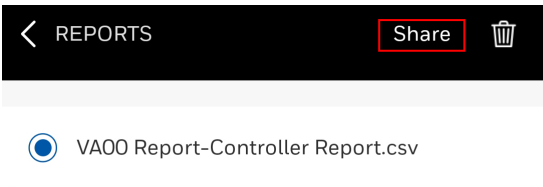


Fig. 51 Balancing Report

RELATED TECHNICAL LITERATURE

Table 2 Related Technical Literature

Title	Reference
Merlin NX IP VAV Product Datasheet	EN0Z-1073GE51
Merlin NX MSTP VAV Product Datasheet	EN0Z-1072GE51
Merlin NX IP and MSTP VAV Installation Instructions	EN1Z-1076GE51
MERLIN NX IP and MSTP VAV Mounting Instructions	EN1Z-1074GE51
Global VAV Balancing Tool User Guide	EN2B-0041IE10
IRM Engineering Guide	EN2B-0414GE51

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