

A powerful feature of the next generation Smart Bypass Motor Actuator is the (NFC) Near Field Communication interface capability. Using your Android or iOS Smart Phone and the Belimo® Assistant APP, you have the ability to manually configure your Smart (self-balancing) Bypass damper in the field.

You will also have access to valuable information and tools such as:

- Observing the total Static pressure (Differential pressure) of the HVAC system in real time.
- Observing the active or idle position of the Smart Bypass damper in real time.
- See the “Closed & Open” static pressure (Dp) values, captured during Static Pressure “learn” mode.
- Manually change the “learned” Static pressure (Dp) set-point to a new set-point of your choice.
- See the total number of hours the Smart Bypass damper has been actively modulating.
- See the total number of hours the Indoor Fan has been running, since the SBD2 was installed.
- Select the “Trend Chart” icon and observe/create a graph of the HVAC system Static pressure (Dp) versus the SBD2’s Static pressure (Dp) set-point *and* the active position of the damper in real time.
- Save or Email the Trend Chart file (.png) to the office, a customer or a colleague.
- Personalize each zoned installation by giving the SBD2 a name or location *eg, Smith residence or Upstairs unit or Basement system.*

\* Android phones with “NFC” enabled, can access the SBD2 data, by placing the phone directly on top of the SBD2 motor, after opening the Belimo® Assistant APP. The SBD2 provides a momentary “snap shot” of all relevant bypass data & functions. As soon as you move the phone away from the SBD2, the NFC link is broken. Place your phone on top of the SBD2 again, to obtain an update and observe new data or to make any desired changes.

\* iOS phones with “NFC” enabled, can also access the SBD2 by directly placing the phone on top of the SBD2 motor. Apple no longer prohibits direct NFC functionality, so you don’t have to use a Blue Tooth to NFC converter. Just make sure your iOS phone firmware is up to date.

\* The Belimo® ZIP-BT-NFC converter, which is placed on top of the SBD2 rather than your Android or iOS phone, is the preferred method of synching to the SBD2 because it maintains continuous access to the SBD2 motor, giving the user some freedom to move about and focus on the APP. The ZIP converter is almost a necessity when creating Trending Charts or setting up “twinned” SBD2’s with staggered static pressure set-points. *eg, 0.40”wc and 0.50”wc.*

\*The ZIP-BT-NFC converter uses NFC to communicate with the SBD2 and communicates to your smart phone via Blue-tooth. If you move too far away from the converter, the blue-tooth link is broken. Moving back into range will prompt the link to re-establish.

\*Android users can also use the ZIP-BT-NFC converter if they choose to do so.

# ULTRA-ZONE™

Forced Air Zone Controls

## Model SBD2 Self-Balancing Smart Bypass Damper w/NFC Interface

### (GETTING STARTED)

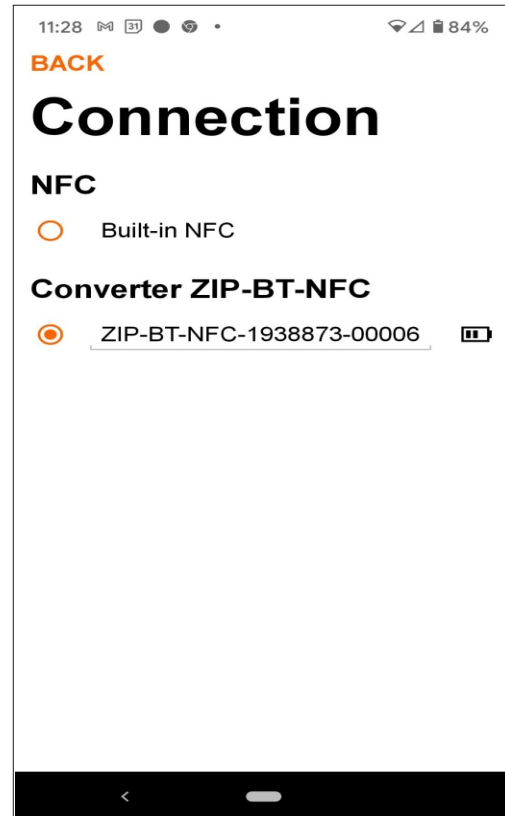
When you first open the Belimo Assistant APP, you will see the “Scan Device” screen OR you may see the “Connection” screen.

Apple iOS smart phones now allow direct “Built-in” NFC function. Apple no longer forces use of the ZIP Converter.

Select “Built-in” NFC regardless of the phone type.

If you have a ZIP converter charged up and ready to go, turn it on. Now your smart phone APP screen will show both connection methods and you can choose the connection method that works best for you.

ZIP converter guidance is discussed on page 9. Proceed to the next page to access the SBD2 motor via “Built-in NFC” direct connection.



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## Model SBD2 Self-Balancing Smart Bypass Damper w/NFC Interface

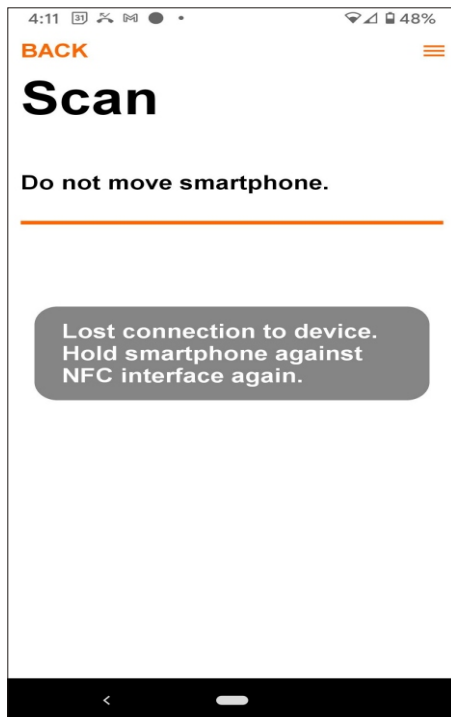
### (GETTING STARTED)

The APP will now prompt you to hold your phone against the SBD2 motor case, in order to synchronize with the motor's programming.

Synchronization is achieved when the NFC logo on the SBD2 motor is aligned with the NFC sensor in your smart phone.

The exact location of the NFC sensor varies with each smart phone, so you may have to slowly move the position of your phone (on top of the SBD2 motor) in order to achieve a good connection.

If you have a thick protective case on your smart phone (otter box), you may need to temporarily remove it, as it will interfere with the NFC signal between your smart phone and the SBD2.



### (FIRST TIME ACCESS)

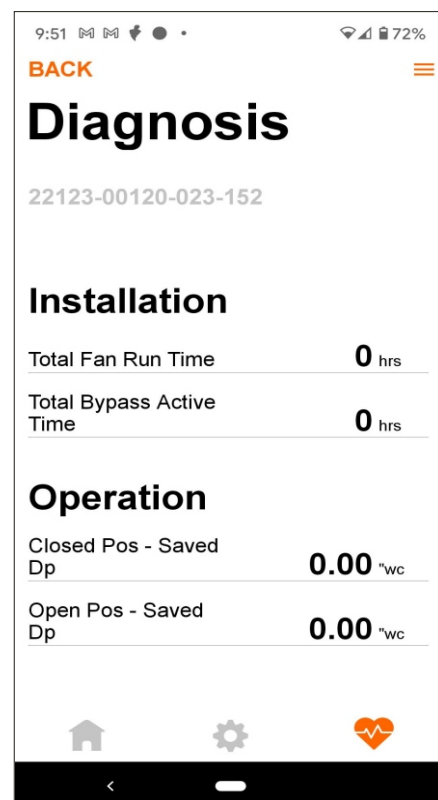
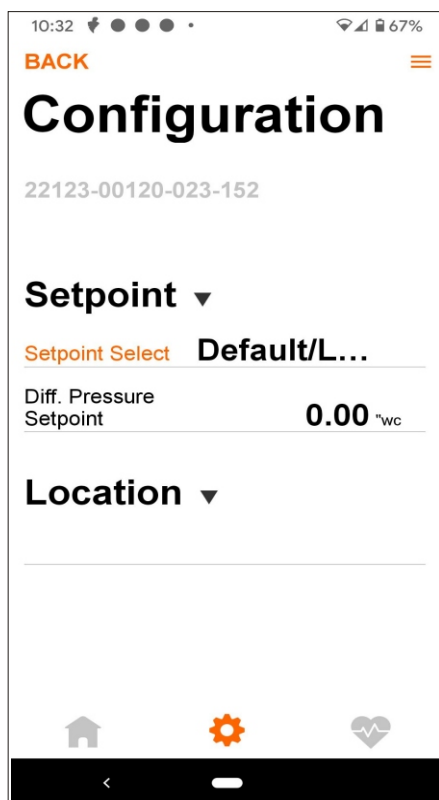
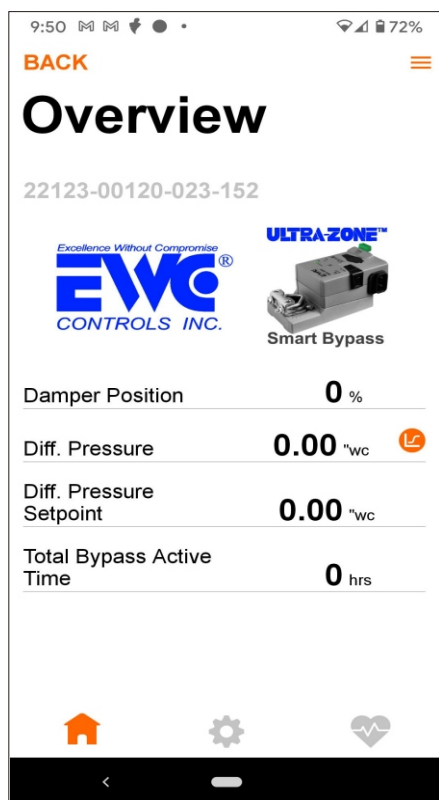
The APP screen shots below reflect what you may see when accessing the SBD2 for the first time, unless the SBD2 was already placed into “learn mode.”

The “Overview” screen is the “Home” screen. The current damper position is displayed, including the actual static pressure (Differential Pressure) and the static pressure set-point. Total Bypass Activity Time is also displayed. The small “orange” chart icon can be selected to create a Trend Chart. When selected, the chart will display the SBD2’s damper position and static pressure set-point, versus the actual static pressure of the HVAC system. You can save the chart or email it to the office or your customer, as proof of the SBD2’s level of precision and accuracy. See page 7.

The “Configuration” screen will show the “Default/Learned” static pressure set-point value **or** the “selected” static pressure set-point. Otherwise, it will display a zero value until a set-point is selected or the SBD2 successfully completes a “Learn” mode. If desired, you can also name the “location” of the SBD2. See page 5 & 6.

The SBD2 will monitor and keep track of how many hours “Total Fan Run Time” the indoor blower has been running, since the SBD2 was successfully installed. The SBD2 will also keep track of how many hours it has actually modulated in order to control the system static pressure at the selected set-point. This data is displayed on the “Diagnosis” screen.

If the SBD2 was placed into “Learn” mode, the “Diagnosis” screen will display the “Saved” Closed & Open Position static pressure (Dp) values it captured during that process, even if “Learn” mode was unsuccessful. Otherwise, these fields will show zero values. See page 8.



# ULTRA-ZONE™

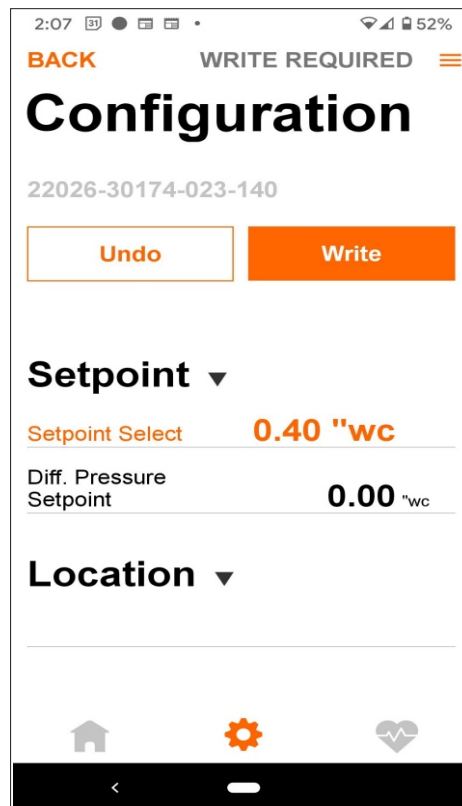
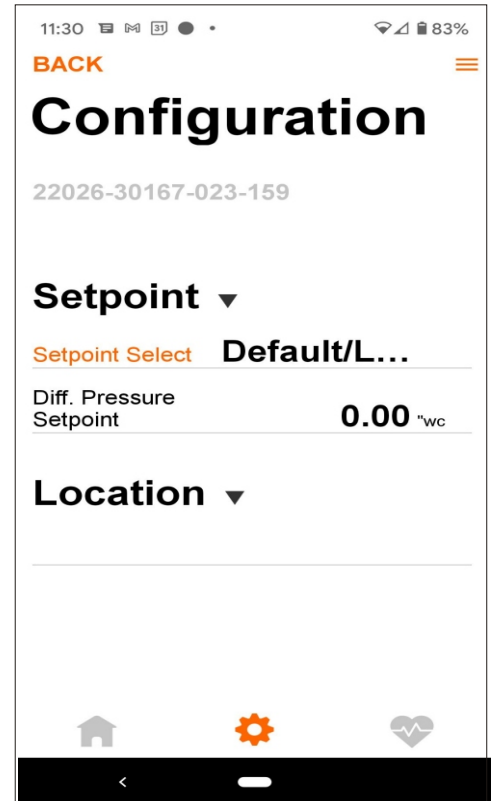
Forced Air Zone Controls

## Model SBD2 Self-Balancing Smart Bypass Damper w/NFC Interface (STATIC PRESSURE $D_p$ SETUP)

Select the “Configuration” (gear) screen to select a static pressure (**Diff Pressure**) set-point. Note, if the “Differential Pressure” set-point field shows 0.00”wc, the SBD2 has not been placed into “Learn” mode yet, **or** Learn mode was unsuccessful. If that field does show a value, then a static pressure set-point was already selected before, **or** Learn mode was successful.

You can decide to select your own static pressure set-point (**even if learn mode was already performed**) or exit the APP and place the SBD2 into “Learn” mode. **Refer to the SBD2 Submittal #090377A0320, at the end of this document.**

To select a new differential set-point, touch the words “Default/Learned” on the screen and a list of static pressure set-points will pop up. Select the desired set-point and the next screen will prompt you to “write” the new set-point to the SBD2 motor. Touch “write” and hold your smart phone against the SBD2 motor again. The APP will write the selected set-point to the SBD2 motor actuator. **See the next page to continue.**





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## Model SBD2 Self-Balancing Smart Bypass Damper w/NFC Interface

(STATIC PRESSURE  $D_p$  SETUP)

The screen to the right shows the selected set-point was accepted and is now displayed on the screen. At this point you are done and can operate your zoned HVAC system. The SBD2 will modulate to hold the static pressure set-point you selected. If you don't like that set-point, refer back to page 5 and select a different static pressure set-point.

If desired, tap the "location" field and type in a location or name to identify this SBD2 in the future. The SBD2 will prompt you to "write" the data into the SBD2, which means you have to hold your smart phone to the SBD2 motor again. You don't have to hold your phone to the SBD2 if you're using the ZIP converter. It will happen automatically as soon as you tap "write".

Now you can switch to the "Overview" (home) screen. If your HVAC system is idle, Damper Position will default to 50% and the Static Pressure (Diff Pressure) field will show 0.00"wc. Otherwise, the damper position will reflect a different value and the Diff Pressure field will show the current static pressure of the HVAC system. The Static Pressure set-point you have selected will also be displayed and *Total Bypass Active Time* will reflect how much time the SBD2 has been modulating.

2:50 [Icons] 46%

**BACK** [Menu Icon]

## Configuration

22026-30174-023-140

**Setpoint ▼**

Setpoint Select **0.40 "wc**

Diff. Pressure Setpoint **0.40 "wc**

**Location ▼**

[Home Icon] [Gear Icon] [Heart Icon]

3:01 [Icons] 42%

**BACK** WRITE REQUIRED [Menu Icon]

## Configuration

22026-30174-023-140

**Undo** **Write**

**Setpoint ▼**

Setpoint Select **0.40 "wc**

Diff. Pressure Setpoint **0.40 "wc**

**Location ▼**

**SBD2 Basement**

[Home Icon] [Gear Icon] [Heart Icon]

3:02 [Icons] 41%

**BACK** [Menu Icon]

## Configuration

**SBD2 Basement**

22026-30174-023-140

**Setpoint ▼**

Setpoint Select **0.40 "wc**

Diff. Pressure Setpoint **0.40 "wc**

**Location ▼**

**SBD2 Basement**



[Home Icon] [Gear Icon] [Heart Icon]

2:51 [Icons] 45%

**BACK** [Menu Icon]

## Overview

22026-30174-023-140

Damper Position **50 %**

Diff. Pressure **0.00 "wc** [Refresh Icon]

Diff. Pressure Setpoint **0.40 "wc**

Total Bypass Active Time **0 hrs**

[Home Icon] [Gear Icon] [Heart Icon]

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Forced Air Zone Controls

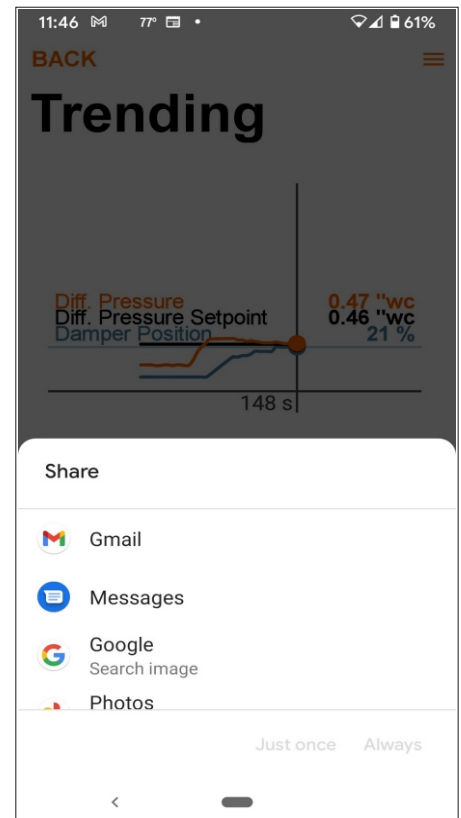
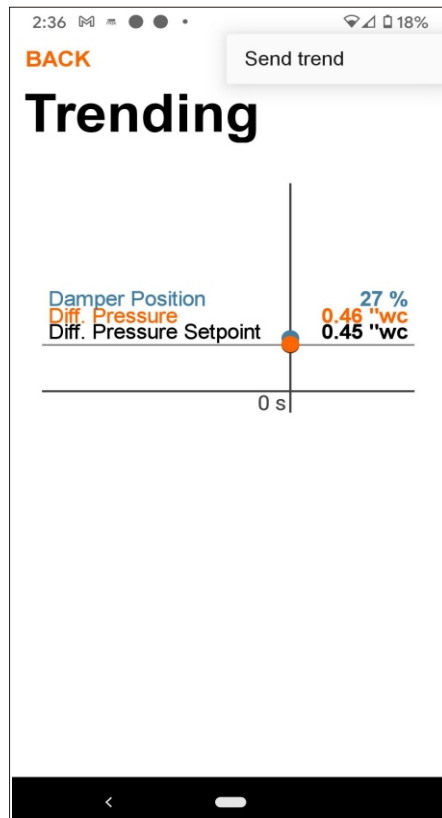
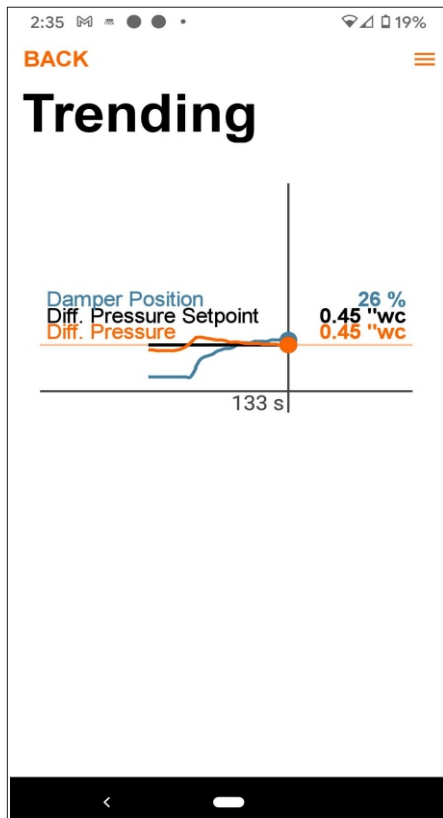
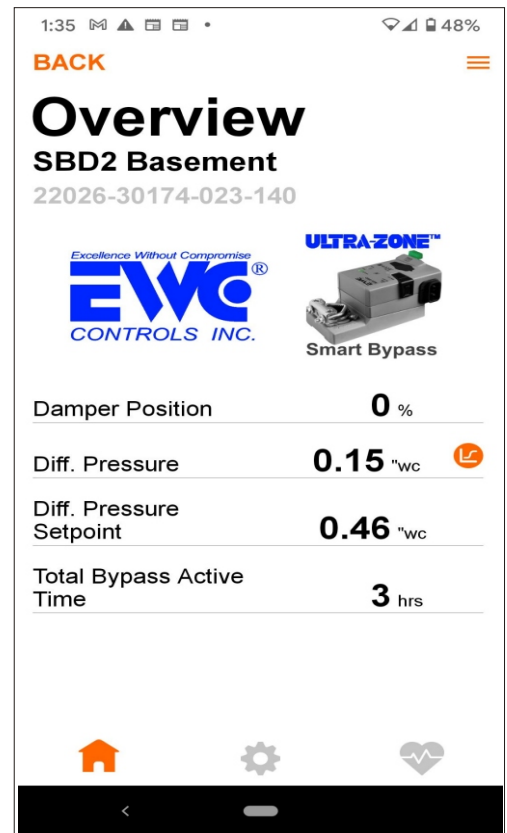
## Model SBD2 Self-Balancing Smart Bypass Damper w/NFC Interface

(CREATE A TREND CHART)

The screen to the right shows the small orange Trend Chart icon. When your smart phone is synched to the SBD2 (*ZIP converter method is best for Trend Charting*) you can chart the SBD2 action, in real time! Capture Trend Chart data during different zonal modes of operation. **eg, Zone 1 closed while Zones 2 & 3 are open. Zone 3 open while Zones 1 & 2 are closed, etc. Start the capture when all zones are open/active and proceed from there.**

Simply tap the trend icon to begin the process. The SBD2 static pressure set-point is shown below in a black line, and the real time system static pressure is shown in orange. The real time damper position is shown in blue. The APP will continue to chart this data (**in seconds**) for as long as you like, although 5 minutes is long enough to obtain the data you need.

Tap the “hamburger” icon at the top field and select “Send Trend”. A selection of different options will pop up. Select your favorite Email program or messaging APP. You can also save the chart and share it later on.



**(LEARN MODE)**

The Diagnosis screens below show a successful and an unsuccessful “learn” mode. The screen on the lower left shows the Open Position static pressure measurement was below 0.10”wc (0.07”wc) and that’s why it was unsuccessful. *Refer to the SBD2 Submittal #090377A0320, at the end of this document.*

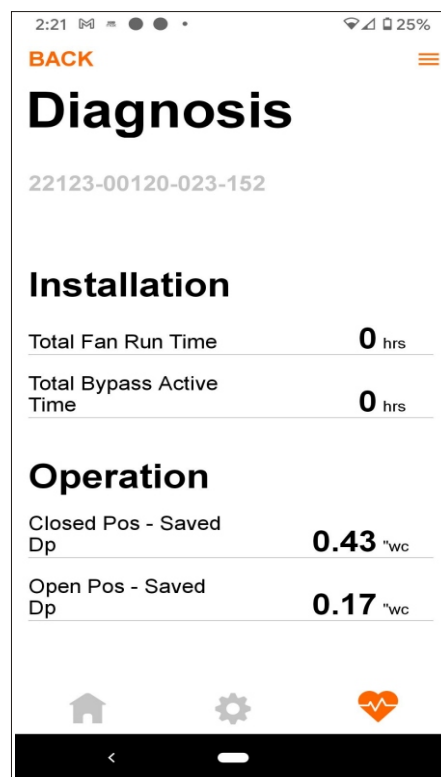
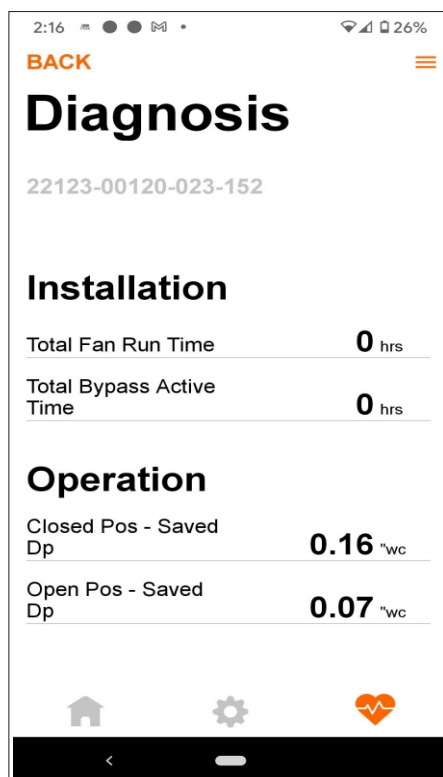
**The criteria for a successful “learn” mode is as follows:**

1. Both the Closed and Open Static Pressure values must measure above 0.10”wc.
2. The “open” measured value must be at least 10% lower than the “closed” measured value.

**Root causes for unsuccessful learn modes can vary:**

1. HVAC system was not running at full BTU capacity when learn mode was initiated.
2. Pitot tube hose connections (+ and -) are crossed at the SBD2 barb fittings.
3. One or both pitot tube hoses are disconnected, loose, kinked or nicked.
4. The duct-work is over-sized and the bypass duct/damper may be too large.
5. One or more ancillary (duct mounted) devices were open/active, when learn mode was initiated:  
\* Duct-mounted Dehumidifier \* Bypass Humidifier \* Duct-mounted ERV/HRV
6. Dehumidify (reduced cfm) mode was active when learn mode was activated.
7. The pitot tube locations (supply and/or return) are not ideal.

If numerous attempts to set learn mode are unsuccessful and all the above root failure causes have been eliminated, then refer to page 5 and manually select your desired static pressure set-point.





# ULTRA-ZONE™

Forced Air Zone Controls

## Model SBD2 Self-Balancing Smart Bypass Damper w/NFC Interface

(ZIP BT-NFC Converter)

The ZIP Converter is the preferred means of NFC interface with the SBD2, Smart Bypass Damper.

If you have a ZIP converter charged up and ready to go, attach it to the front of your SBD2, and turn it on. Align the LED circle with the NFC logo as shown below. ***(There is a tactile surface on the back of the converter and it will “stick” to the SBD2 front case. A lanyard is provided to secure the converter just in case the converter slips off).***

Now your smart phone APP screen will show both connection methods. iOS phone users and Android phone users can select either method and usually opt for the ZIP converter, because it eliminates the need to keep re-synching your phone to the SBD2.

Note the ZIP Converter method also displays the battery strength level, and the clear LED ring on the Converter will illuminate when it is synchronized to the SBD2 and during charging mode.



# ULTRA-ZONE™

Forced Air Zone Controls

## Model SBD2 Self-Balancing Smart Bypass Damper w/NFC Interface

### *(A FEW FINAL TIPS)*

Thanks for choosing the 2nd generation SBD2 Smart Bypass Damper with NFC Interface.

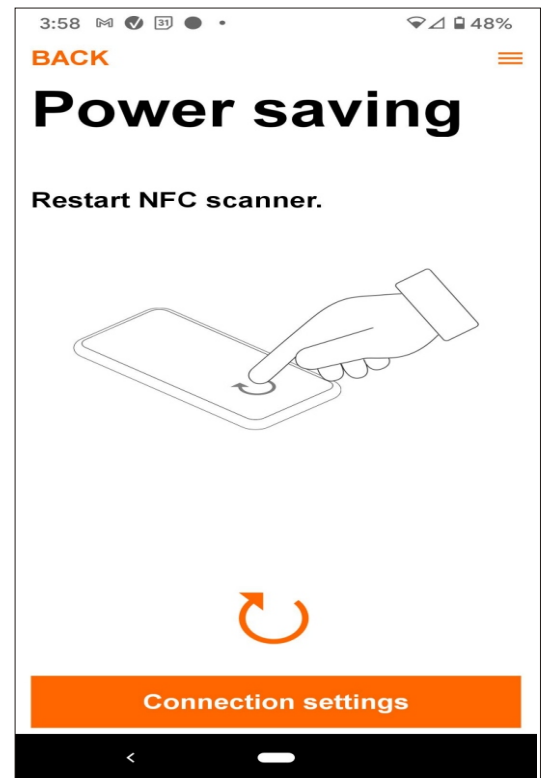
Combined with the Belimo Assistant APP, the SBD2 is a wise choice for precise airflow management of your zoned HVAC system.

This Application Note provides important tips on how to utilize the Belimo Assistant APP and get the most out of your Smart (self-balancing) Bypass damper.

While using the Belimo Assistant APP you may find other screens that were not discussed in this document. Simply follow the prompts and navigate the user friendly APP as you would any other.

The SBD2 submittal sheet along with the Belimo Assistant APP quick start guide, are attached for quick reference.

If you have any questions or concerns, call EWC Technical Support at 800-446-3110.



# ULTRA-ZONE™

## Forced Air Zone Controls

### SBD Motor Actuator Specifications:

**Operating Range** - .25" - 1.8" W.C.

**Pressure Sensor** - Belimo® D3 Dynamic Response

**Air Pressure Connectors** - 1/4" OD barbs integrated x2

**Power** - 24vac @ 4.0 volt/amp / 2.0 watt

**Wiring** - 18 AWG copper

**Case** - NEMA 3S, IP54

**Gear Release** - Manual

**Maintenance:** No Maintenance Required

**Memory:** Non-Volatile

**Interface:** NFC - Near Field Communication

**Listings** - UL, CE **Compliance** - ACCA Manual Zr

**Pitot Tubes** - Included x2

**Pressure Tubing** - 1/4" ID x 16' (NSF-51) Included x1

**Mounting** - The SBD can be mounted horizontally, vertically, or any other position required in the field.

### Description of the SBD2 Motor Actuator:

The Smart Bypass Motor Actuator is a digital differential pressure controller with an integrated PI loop and intelligent software. **The Smart Bypass Damper is the only industry bypass solution that can automatically measure, monitor and maintain the designed operating static pressure of the HVAC system in all modes of operation.**

The Smart Bypass Damper includes all accessories needed for field installation. If desired, a smart phone can be used to access the SBD's powerful features.

### Submittal Specifications:

Furnish and install a Model SBD2 self-balancing bypass damper manufactured by EWC Controls. Round SBD2's are fabricated from 24 gauge galvanized steel. Rolled shells include one female end and one male (crimped) end, with rigid stiffening beads. Includes pressure drop baffling for improved damper authority and linear response. Round SBD's are equipped with a Poron® gasket on the blade.

**\*Specify model SBD2 - 8", 10", 12", 14", 16", 18", 20"**

Furnish and install a Model SBD2 self-balancing bypass damper manufactured by EWC Controls. Rectangular SBD2's shall be fabricated from mill finished, extruded 080" aluminum and glass filled nylon bearings. Includes pressure drop baffling for improved damper authority and linear response.

**\*Specify model SBD2 - 12x8, 12x10, 12x12, 20x8, 20x10, 20x12, etc.**

**\*Custom sizing is available, call for details.**

Excellence Without Compromise  
**EWC**®  
 CONTROLS INC.

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 Englishtown, NJ 07726  
 Ph: 800-446-3110  
 Fx: 732-446-5362

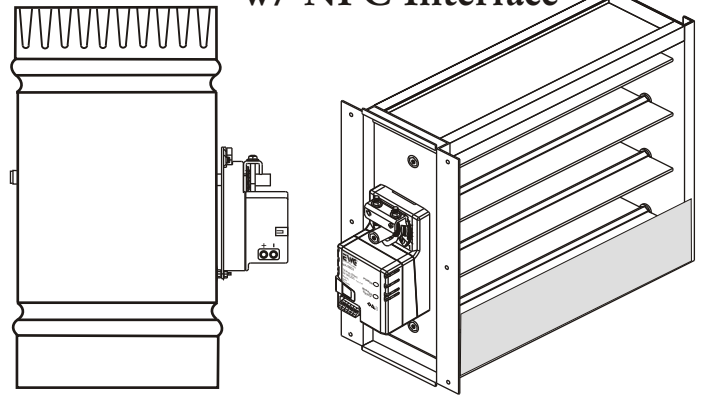
## SUBMITTAL SHEET

Model SBD2

Self-Balancing

Smart Bypass Damper

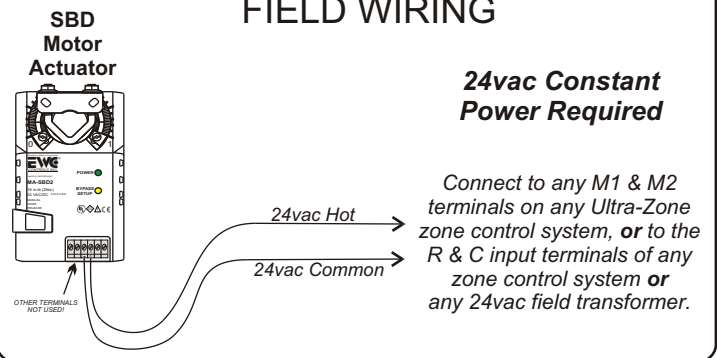
w/ NFC Interface



### How the Smart Bypass Damper Works:

The Ultra-Zone *Smart Bypass Damper* captures *(with the push of a button)* the total static pressure of the HVAC system during non-zoned mode, and modulates to maintain that same static pressure value, during zoned mode. As individual zone dampers open or close, the HVAC system static pressure will fluctuate. In order to maintain the true static pressure of the HVAC duct system during zoned HVAC operations, a bypass duct with a reliable bypass damper and a smart motor actuator must be installed. **No other bypass damper is easier to setup, than the Ultra-Zone Smart Bypass Damper.**

### "SBD2" SMART BYPASS DAMPER FIELD WIRING



### SUBMITTAL FORM

SUBMITTED BY: \_\_\_\_\_

JOB: \_\_\_\_\_

ARCHITECT: \_\_\_\_\_

ENGINEER: \_\_\_\_\_

CONTRACTOR: \_\_\_\_\_

LOCATION: \_\_\_\_\_



### Installing the SBD2 Bypass Damper:

Power up the SBD2 after installing it. The SBD2 will default closed and remain closed until you are ready for setup.

The pitot tubes and reference tubing are included with the SBD2. **Make sure you have removed these items from the shipping box before you throw the box away!**

**Due to the unique design and the self-balancing feature of the SBD2, there is no need to install and setup a separate bypass balancing hand damper.**

Mount both pitot tubes within 2 feet of the air handler on the center line of the Supply & Return plenums. **Observe the direction of airflow stamped on the pitot tube mounting plate. (See the graphic below)**

Connect each pitot tube to the SBD2 barbed fittings using the supplied 1/4" ID plastic tubing. **Keep the plastic tubing as short as possible with no kinks, cuts or nicks.** Connect 24vac power to the SBD2 motor actuator.

Upon power-up, the SBD2's Power LED will glow solid green. The yellow Bypass Setup button LED will blink, to indicate the SBD2 is ready and waiting for you to press the by-pass setup button LED and start the "Automatic Setup" routine.

### Preparing for Smart Bypass Setup:

Before pressing the *Bypass Setup* button LED, the installer must confirm the following:

- (1) Both pitot tubes have been properly installed.
- (2) All zone dampers are in the open position.
- (3) **The HVAC system is running at full (CFM) speed!**
- (4) De-humidification mode/profile is not engaged. Wait 15 minutes after cooling startup, to ensure the enhanced airflow profile function is complete.
- (5) Ancillary devices such as ERV's and bypass type Humidifiers are off-line and isolated.
- (6) The system air filter is new or clean.

**Proceed to the Smart Bypass Setup (LEARN) Procedure!**

# SUBMITTAL SHEET

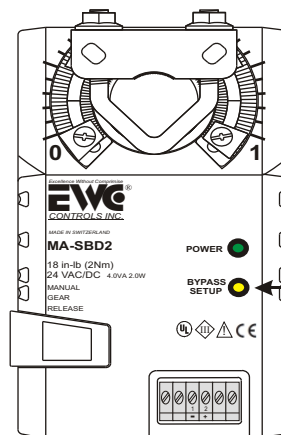
## Model SBD2 Self-Balancing Smart Bypass Damper w/NFC

### Smart Bypass Setup Procedure:

Upon power-up, the Bypass Setup button LED is blinking (*waiting for "Auto Setup" Learn routine*).

1. With a pencil or pen, press the Bypass Setup button LED one time only! The Setup LED will light up solid, indicating an active Automatic Setup routine.

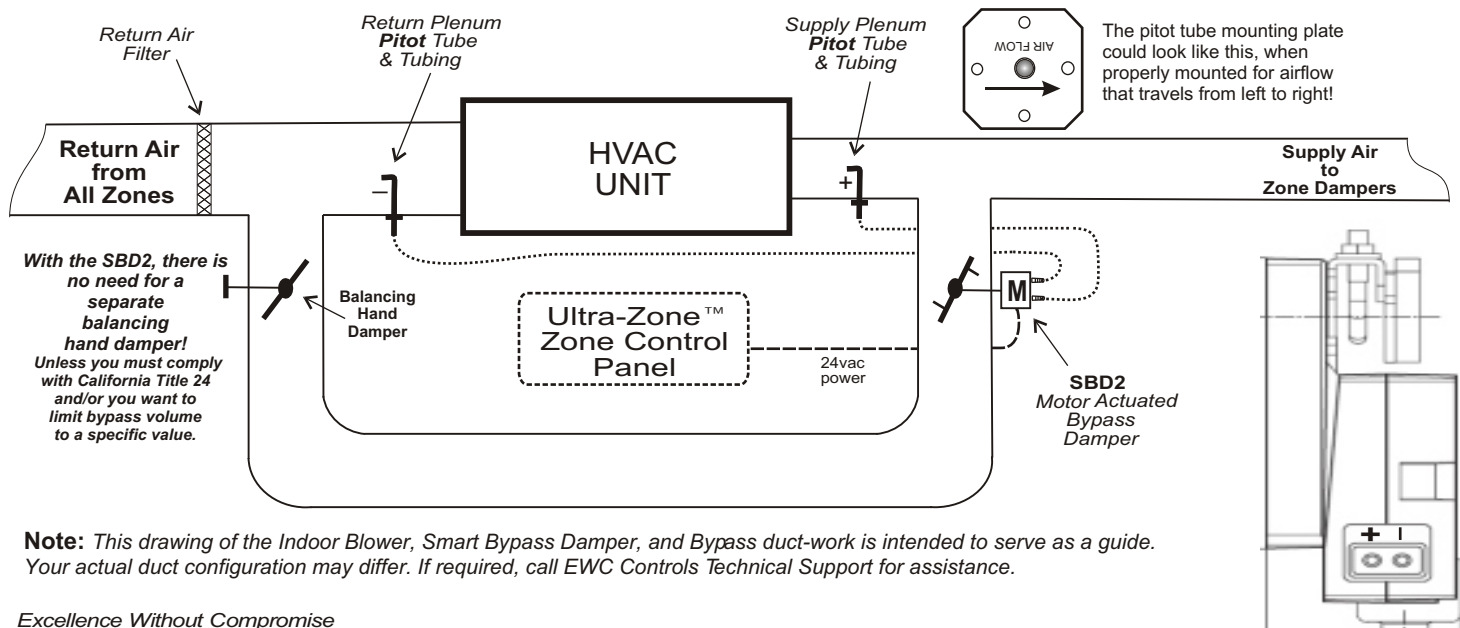
- A. The SBD2 will open and measure the system's total static pressure.
- B. The SBD2 will close and measure the system's total static pressure.
- C. If successful, the Bypass Setup LED will go out. **You are Done!**
- D. If your SBD resumes blinking, double check the hoses and pitot tubes for proper installation, repair any issues and then try again.
- E. Once the Setup LED stops blinking, you are done. The SBD2 will now control the system static pressure in all modes of operation.
- F. During idle periods, the SBD2 will stroke partially open. The SBD will close or modulate as necessary, when the blower starts back up again.



If your SBD does not "Auto Setup", use the **Belimo Assistant APP** to manually select a Static Pressure set-point!

Press the Bypass Setup button LED to "Auto Setup"

### EWC Controls Recommended Bypass Duct Configuration



**Note:** This drawing of the Indoor Blower, Smart Bypass Damper, and Bypass duct-work is intended to serve as a guide. Your actual duct configuration may differ. If required, call EWC Controls Technical Support for assistance.

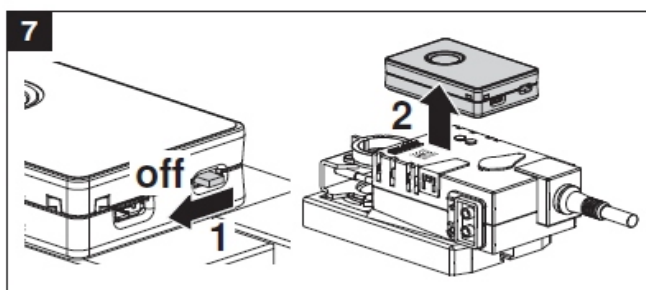
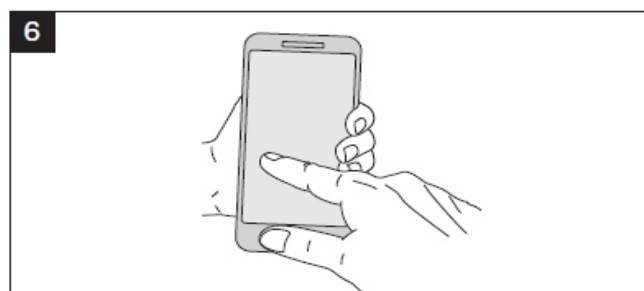
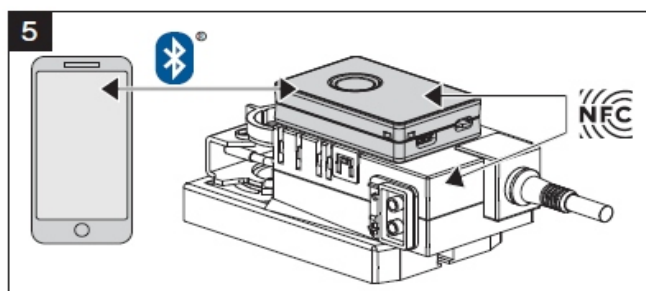
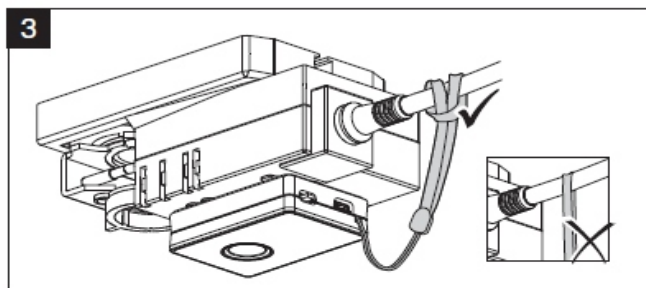
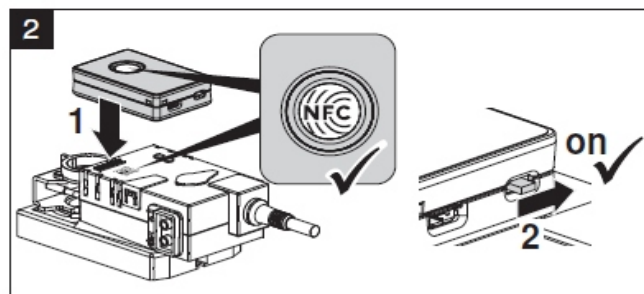
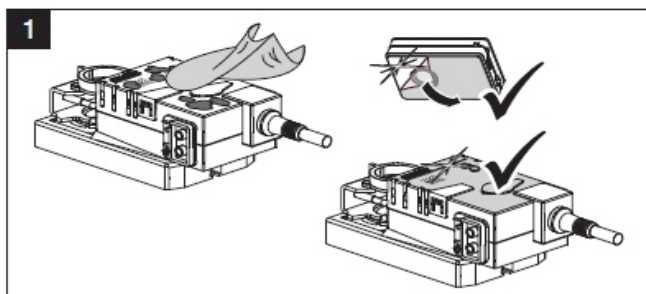
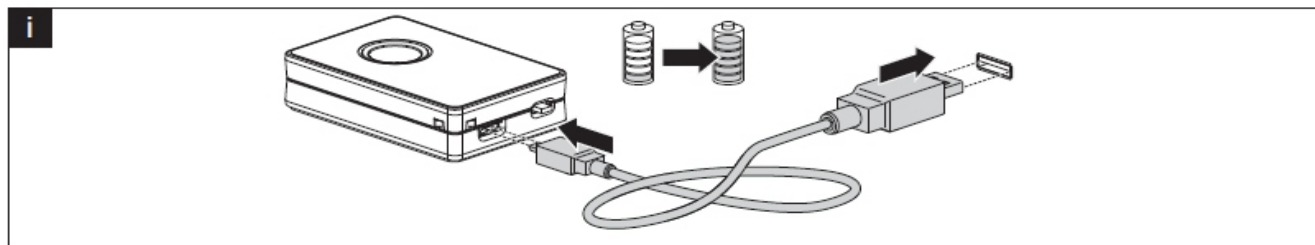
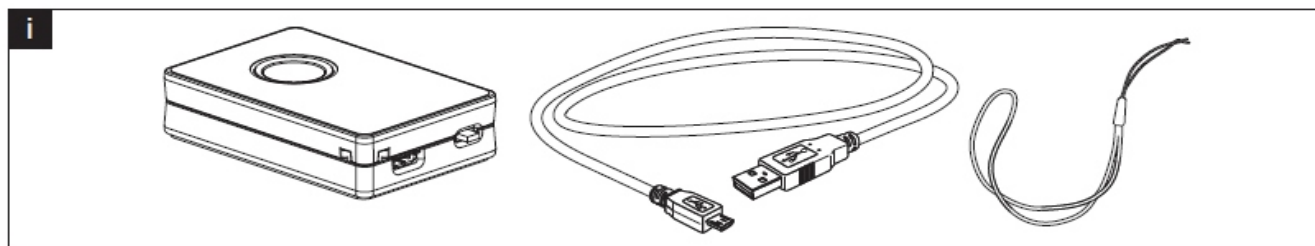
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**EWC**<sup>®</sup>  
CONTROLS INC.

385 Hwy. 33 Englishtown, NJ 07726  
Ph: 800-446-3110 - Fx: 732-446-5362

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Connect the pitot/tubing from the Supply plenum to the + port.

Connect the pitot/tubing from the Return plenum to the - port.



[www.belimo.com/safety](http://www.belimo.com/safety)



## Job Notes:

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