Honeywell

RapidBalance

EXCEL 10 VAV II

USER GUIDE

Contents

74-3970

INTRODUCTION

Description of Software

The Honeywell RapidBalance™ software is a program that facilitates balancing Honeywell Excel 10 Variable Air Volume (VAV) controllers installed in VAV box systems. The software runs on a laptop or desktop with Microsoft® Windows® 95/98/2000 and Windows NT®.

RapidBalance auto discovers the Excel 10 VAV network once connected through a LONWORKS® adapter (such as the PCC-10 PCMCIA LONWORKS adapter card). The Excel 10 VAV controllers are conveniently listed by neuron ID and by VAV device name. The list of VAV devices viewed by the user can be manipulated for ease of use by sorting the VAV device names alphabetically, or for larger systems, by a user defined neuron id or device name filter.

The primary function of Honeywell RapidBalance is to allow the user to balance a selected VAV box to the maximum flow setpoint. Optionally the user can also balance the VAV box to the minimum flow setpoint for higher accuracy.

The RapidBalance software can also be used to drive multiple VAV boxes to maximum or minimum air flow. This is done from the main screen of the software by selecting multiple VAV device names using standard Windows convention.

A VAV box can be driven to a user specified damper percentage value, or to a user specified air flow value.

A report generation can also be launched at any time as a powerful means of documenting the VAV system and its balancing parameters.

This document describes how to do the following:
- Installation of the software
- Starting up the software
- Connecting via a LONWORKS Network Interface to an Excel 10 VAV network
- Selection of File Preferences
- Step by step guide to balancing an Excel 10 VAV
- Description and guide to other features
- A guide to the RapidBalance Reports

Abbreviations and Definitions

Box -A VAV terminal unit box.

LONWORKS® Bus -Honeywell implementation of Echelon® LONWORKS network for communication among Excel 10 Controllers.

LONWORKS Bus Segment - A LONWORKS Bus section containing no more than 60 Excel 10s. Two segments can be joined together using a router.

LONWORKS Channel - A LONWORKS channel describes the media over which devices communicate (LonTalk protocol), and is the physical network connection of nodes. Different channels can be connected together with routers.

LONWORKS Domain - A LONWORKS user specified addressing system, representing a logical quantity of nodes on one or several channels.

LONWORKS Router - An Echelon device that logically and physically separates subnet.

Echelon® - The company that developed the LON® bus and the Neuron® chips used to communicate on the LONWORKS Bus.

Measured Airflow -The airflow measured at the actual VAV box, typically done by a Balancer with a flow hood.

Neuron Chip -A family of VLSI components that implements the LonTalk protocol.

Neuron ID -A unique 48-bit number assigned to each Neuron Chip during manufacturing.

Node -A Communications Connection on a network; an Excel 10 Controller is one node on the LONWORKS Bus network.

NV -Network Variable; an Excel 10 parameter that can be viewed or modified over the LONWORKS Bus network.

PC -An IBM compatible Personal Computer with 386 or higher processor and capable of running Microsoft Windows Version 3.1.

Sensed Airflow -The airflow sensed by the Excel 10 microbridge.

Subnet - A LONWORKS Bus segment.

VAV -Variable Air Volume; refers to either a type of air distribution system, or to the W7751 Excel 10 VAV Box Controller that controls a single zone in a variable air volume delivery system.

W7751 -The model number of the Excel 10 VAV Box Controllers (also see VAV).

Wall Module - The Space Temperature Sensor and other optional controller inputs are contained in the T7770 or T7780 Wall Modules.

INSTALLATION OF RAPIDBALANCE

RapidBalance is obtained via web delivery over the Internet. To access the RapidBalance download website, see your Authorized Honeywell field representative.

Once the user has downloaded the RapidBalance Setup.exe file, double click on the setup.exe file to run the installation program. The installation program will walk the user through the steps to load RapidBalance on a PC.

Fig. 1 through 4 show the dialogue boxes that the user will see upon installation.

Fig. 1 shows the dialogue box which asks the user to install RapidBalance to a specific location. Type the location or press “Browse” to select a folder to place the software. Press “Next” to go to the next step.

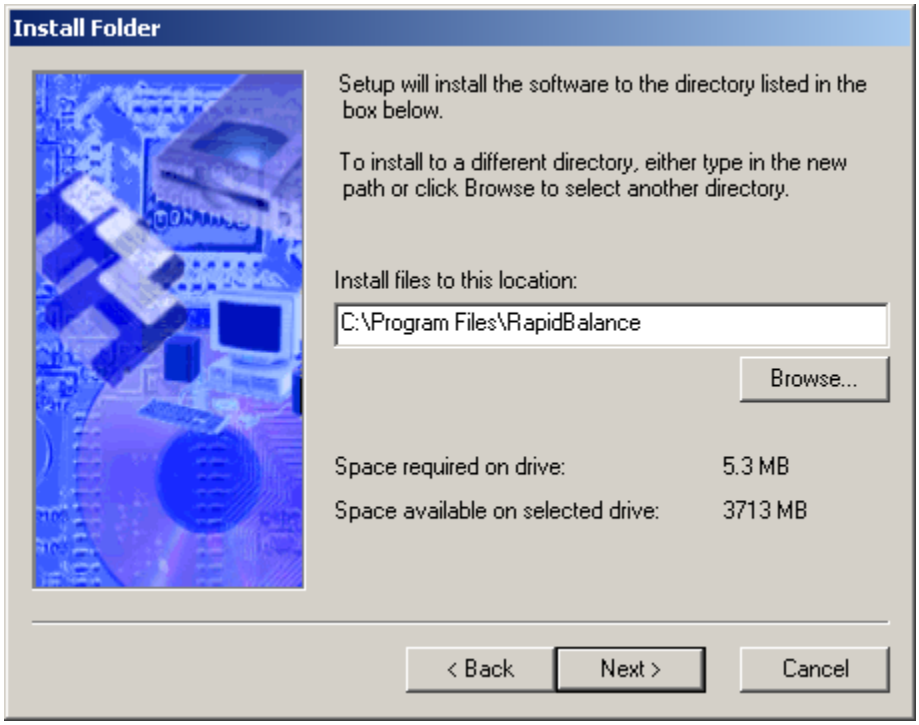

Fig. 1. Install Process; Install Folder screen.

Fig. 2 below shows the dialogue box that appears after selecting a folder to download the software to. This step asks the user if a shortcut folder is desired. The default can be accepted as shown, or the user can type in a new name for the folder.

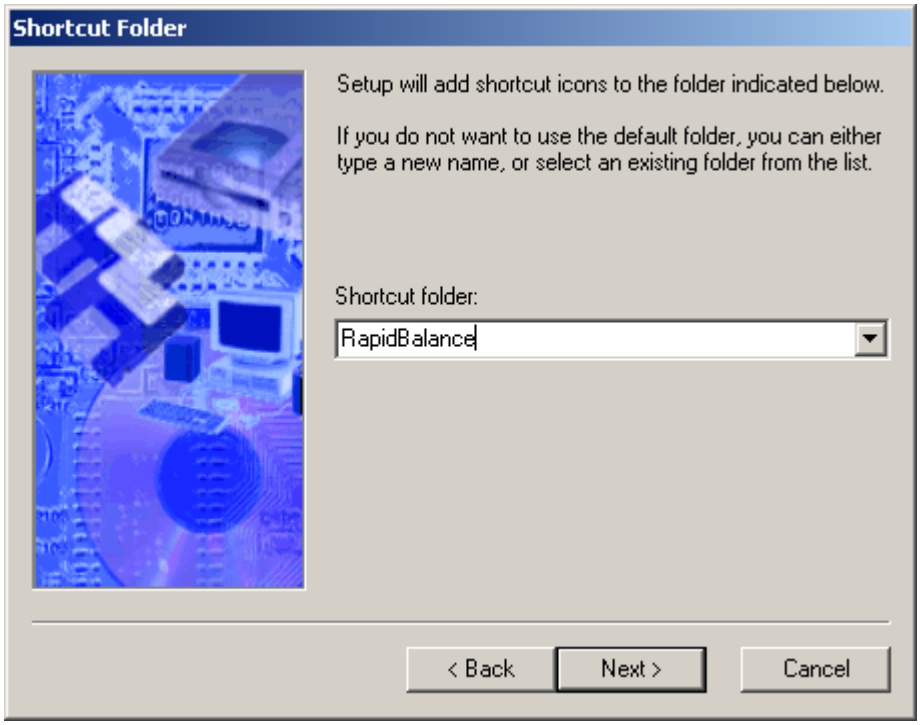

Fig. 2. Install Process; Shortcut Folder screen.

After the user hits Next to adding a shortcut icon, the next dialogue box asks the user to click on the “Install” button to install the software to the user’s hard drive. See the dialogue box shown in Fig. 3 below.

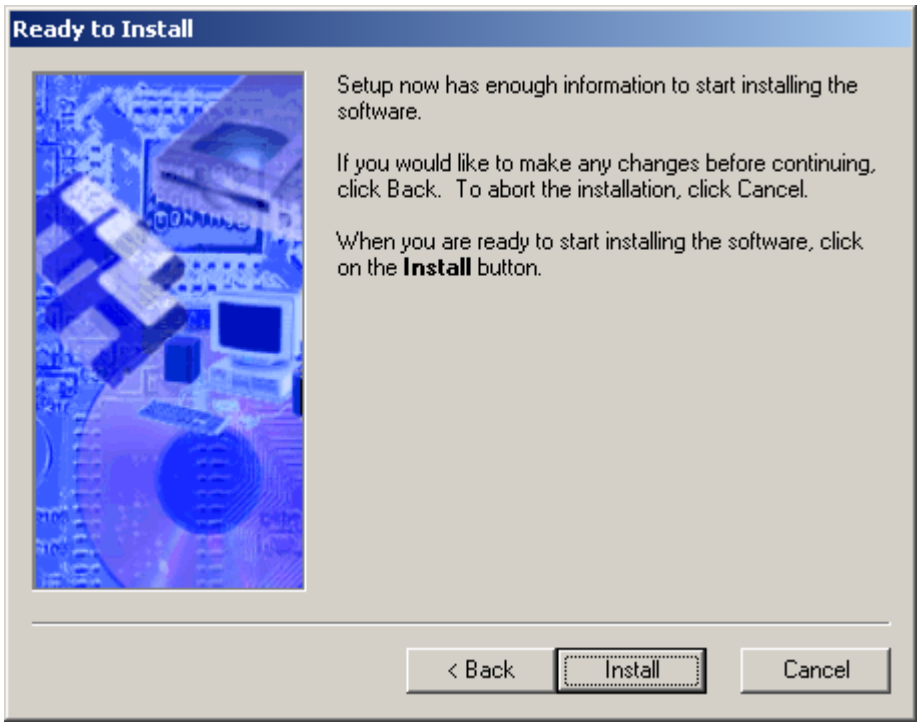

Fig. 3. Install Process: Ready to Install screen.

After clicking “Install” as in Fig. 3, the software will proceed to install the necessary files on the user’s PC. To finish the installation procedure, click “Finish” on the screen shown in Fig. 4.

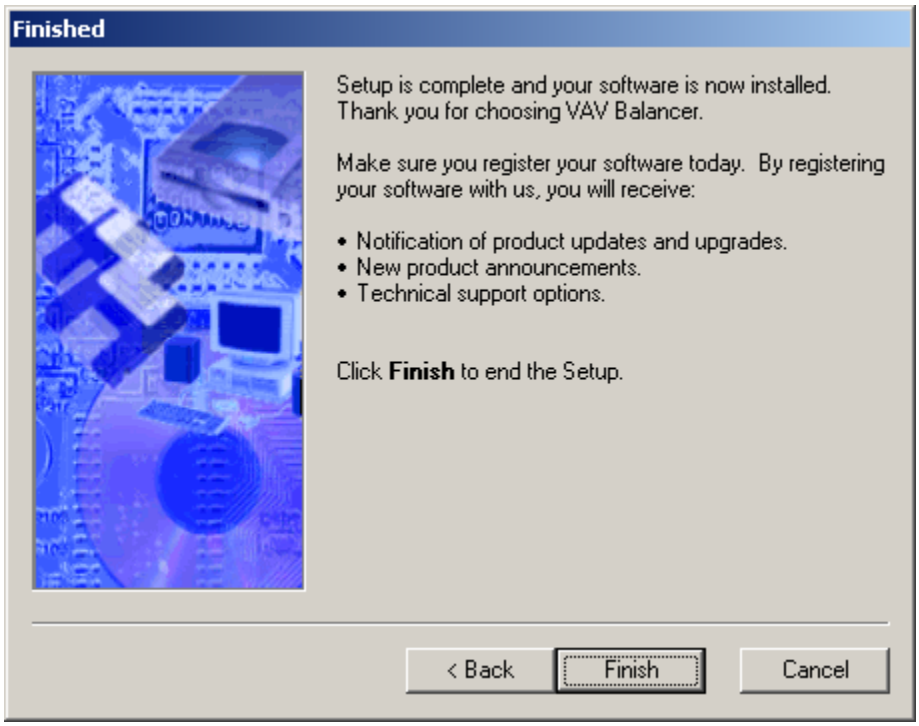

Fig. 4. Install Process: Finished screen.

Once the “Finish” button is selected, the user will be instructed that the PC needs to be re-booted for the changes to take effect. The user can choose to re-boot the PC immediately, or can select to re-boot later.

STARTING RAPIDBALANCE

RapidBalance is started by first selecting the RapidBalance Icon (see Fig. 5) and double-clicking the icon.

Fig. 5. RapidBalance icon.

The balancing tool will immediately connect and auto-discover Excel 10 VAV’s if the laptop or PC the user is using is connected a LONWORKS Network. The RapidBalance default for the connection is an Echelon PCC-10 card (see section on Connecting via LonWorks Network Interface on page 5). For a LONWORKS connection with a different type of Echelon adapter, please see the specific section below.

Connecting via LONWORKS Network Interface

The Honeywell Excel 10 VAV controllers run on the Open Echelon LONWORKS bus. There are several LONWORKS Network interfaces that allow the user to connect via a PC to a LONWORKS bus. The various connections are briefly described below. Before installing any Echelon LONWORKS device, it is necessary to download the latest driver and documentation for that device from the Echelon web site (www.echelon.com).

NOTE: It is necessary to download the driver for the LONWORKS Network Interface before installing the Interface itself.

The following table lists some of the commonly used Echelon LONWORKS Network Interface devices, along with the Honeywell and Echelon part numbers. The sections below address the specifics of connecting with each of these devices.

Table 1. LONWORKS Network Interfaces.

Product	Interface	Honeywell Part No.	Echelon Part No.
PCC-10 PC LonTalk Adapter	Type II PC Card	Q7752B2009	73200
PCLTA-20 LonTalk Adapter	Half-length PCI bus card	Q7751C2016	74401
PCC-10/PCLTA-20 2-conductor cable assembly	Cable connector for PCC-10	included with Q7752B2009	78300
SLTA-10 Serial LonTalk Adapter	External desk or wall mountable box	Q7760A2001	73351
SLTA 2-conductor cable assembly	Cable connector for SLTA-10	included with Q7760A2001	78303

Connecting via PCC-10 Card

The PCC-10 PC card is the default for connecting to the LONWORKS bus with the RapidBalance tool. The PCC-10 Type II PC card (formerly PCMCIA) provides a convenient interface from a Laptop to a LONWORKS network. The PCC-10 card is compatible with Microsoft Windows 95/98/2000 and Windows NT. The card connects to the LONWORKS bus from the PCC-10 card via a cable to a network jack on an XL10 controller or T7770 Wall module. Alternatively, the PCC-10 card can connect via 2 twisted pair wires to the LonBus connectors on the Excel 10 Smart VAV controllers.

If the user is not using a PCC-10 Card, or a PCLTA-20 card, RapidBalance will require the user to change the default settings found in the “File” “Preferences” dialogue box. See the sections below on the settings.

Connecting via PCLTA-20 Card

The PCLTA-20 card is a half-length PCI card that fits within a desktop PC. The PCLTA-20 PC LonTalk Adapter is suited for desktop PC’s with a 32-bit Peripheral Component Interconnect (PCI) interface. It is compatible with Microsoft Windows 95/98/2000 and Windows NT. The card connects to the LONWORKS bus via the 2-conductor cable/network jack, or via 2 twisted pair wires to the LonBus connectors on the Excel 10 VAV controllers.

Connecting via SLTA-10 Adapter

The SLTA-10 Serial LonTalk Adapter is a LONWORKS interface for use with a laptop or desktop. The SLTA-10 Adapater is compatible with Microsoft Windows 95/98/2000 and Windows NT. The adapter connects to the PC to the adapter with a female DB-9 serial connector. The adapter connects to a LONWORKS network with a 2-conductor cable connector.

The user will need to go into the menu item titled “File” and select “Preferences”. The screen is shown in Fig. 6. The user can select the appropriate choice under “Communications” for the com port the SLTA is connected to.

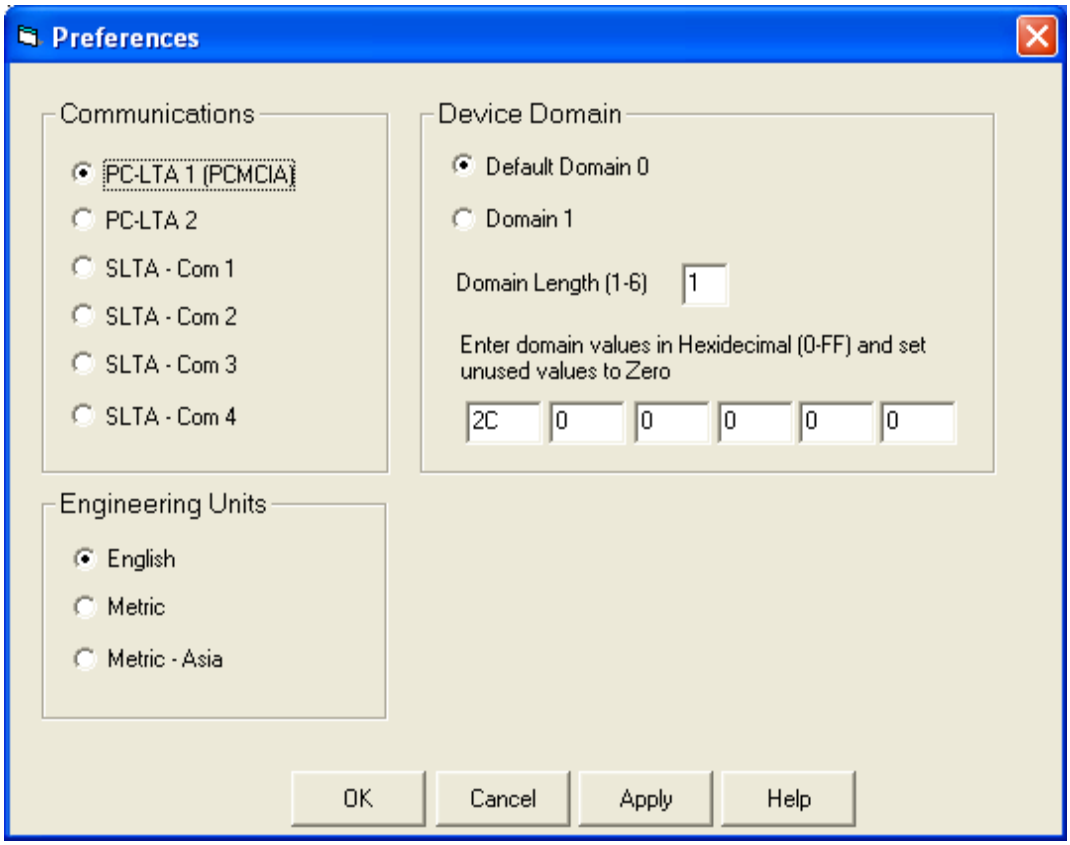

Fig. 6. Preferences screen.

Selecting File Preferences

Other file preferences in addition to Communications can be chosen by the user by selecting “File” and then “Preferences” under the menu.

As shown in Fig. 6, Engineering Units can be specified from this dialogue box. Choices for units include English (default), Metric, or Metric-Asia.

Additionally, the right column of the File Preferences dialogue box allows the user to select the Device Domain. Domains are used in LONWORKS networks as a logical limitation of nodes. A domain can contain over 32,000 nodes. Different domains can be used in larger systems to isolate nodes on a channel.

Honeywell LONSPEC™ and E-Vision configured databases use the default of Domain 0. Honeywell CARE allows the definition of domains with lengths of 0,1,3, and 6. The domain values are entered in Hexadecimal into the 6 boxes leave the unused ones as 0. RapidBalance allows the user to define the Device Domain and their values for large CARE engineered systems with more than one domain, or a domain other than the Domain 0. Please see the CARE user guide, Honeywell Form No. 74-5587 for more information on domains and how they are set with CARE.

RapidBalance Main Screen

Once RapidBalance is connected to an Excel 10 VAV network, the main screen will populate with the Excel 10 VAV’s that it is connected to. The Excel 10 controllers are shown by Neuron ID, VAV Device Name, Subnet, and other balancing parameters. An example of the main screen is shown in Fig. 7.

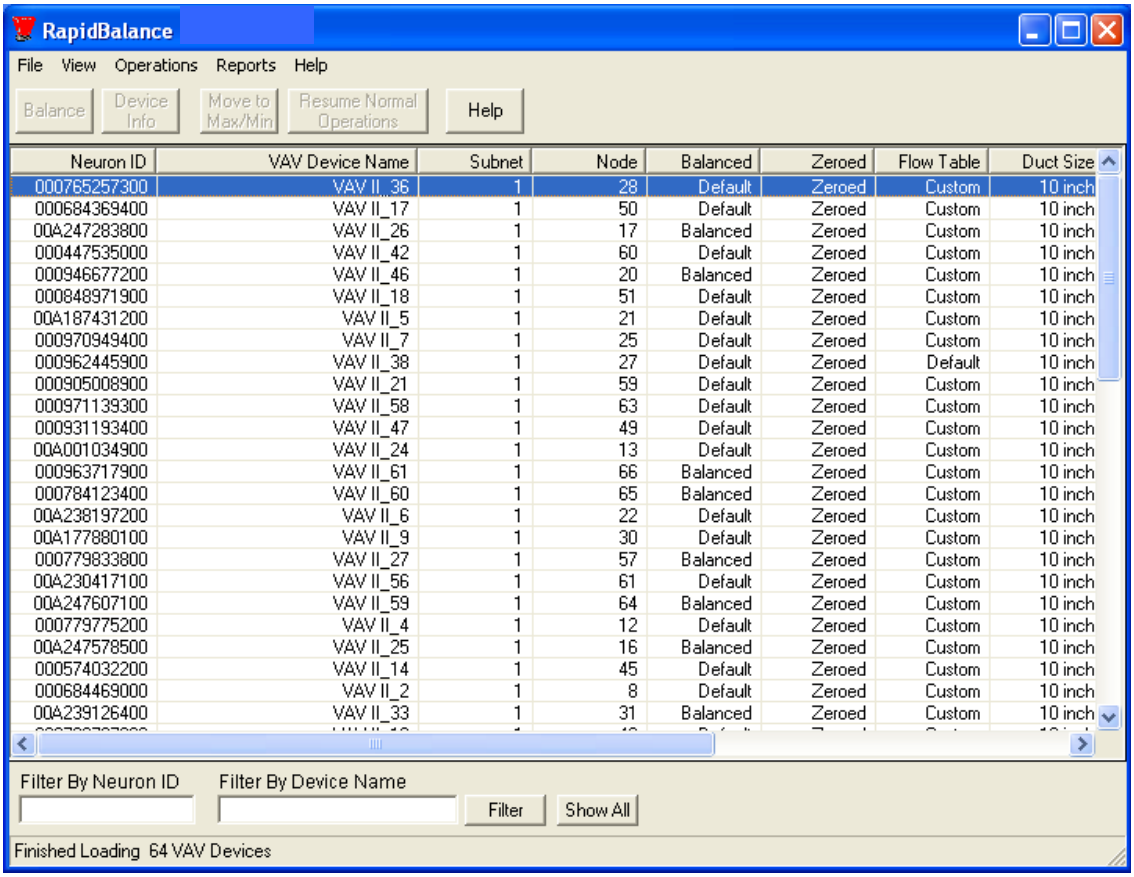

Fig. 7. RapidBalance main screen.

The following column headings are defaults and are shown on the main screen after connecting:

- Neuron ID
- VAV Device Name
- Subnet
- Node
- Balanced (whether the box has been balanced)
- Zeroed (whether the box has been calibrated to zero)
- Flow Table (either Custom for a user downloaded flow table, or Default for the factory default flow table)
- Duct Size
- Duct Area
- K-Factor
- Max Setpoint
- Min Setpoint

Additionally the user can select a number of parameters to list on the main screen. The user could also de-select the defaults as shown above. The main screen columns can be set by accessing the menu item “View” and “Columns”, which displays the “Select Device List Columns” dialogue box. This dialogue box allows the user to check the columns desired on the main screen. See Fig. 8.

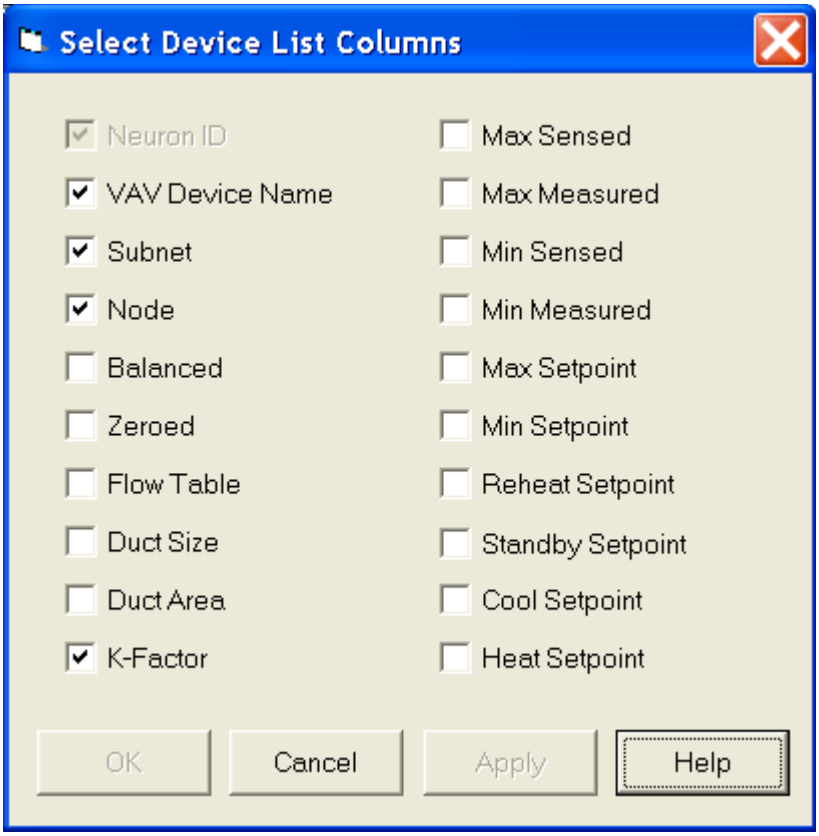

Fig. 8. Select Device List Columns.

The user can sort the VAV devices in alphabetical order by clicking once on “VAV Device Name” on the main screen. To balance a specific VAV, click on the controller in the VAV Device Name list that the user is ready to balance.

The user can display a group VAV devices by using the “Filter By Neuron ID” or “Filter By Device Name” (see Fig. 7). The user can enter a partial string to display only VAV device names with that string. Neuron ID’s can be filtered in the same manner. This feature is useful for large jobs to segment the list of VAV’s to make it more manageable.

The user has the option of accessing operations from the main screen always through the menu titled “Operations”. For convenience, the most commonly used operations can be accessed via the buttons titled “Balance”, “Device Info”, “Move to Max/Min” and “Help”. All operations are described in the sections of this document below.

To refresh the list of VAV devices, or to re-seek and auto discover the nodes that RapidBalance is connected to, the user can select “View” and “Refresh”. After auto-discovering a set of nodes once, if “View” and “Refresh” are selected, a screen will appear to warn the user the amount of time it took the last time to load the set of nodes. For large systems (over 200 VAV boxes), this process could take several minutes. However, the user can continue to work while RapidBalance is populating the VAV fields.

BALANCING AN EXCEL 10 VAV

Once communication is established with the LONWORKS bus, RapidBalance will auto discover the Excel 10 VAV’s on the bus. The software will add nodes as it discovers them, listing them by neuron id and VAV device name. The main screen will show all of the Excel 10 VAV devices that it discovers. The subnet and node will also be listed for each device. See Fig. 7.

The user can access the balancing screen three ways:

- double-clicking the VAV in the list
- selecting the VAV and clicking the button titled “Balance”
- selecting the VAV and clicking “Operations” then “Balance”

The balancing screen is shown in Fig. 9.

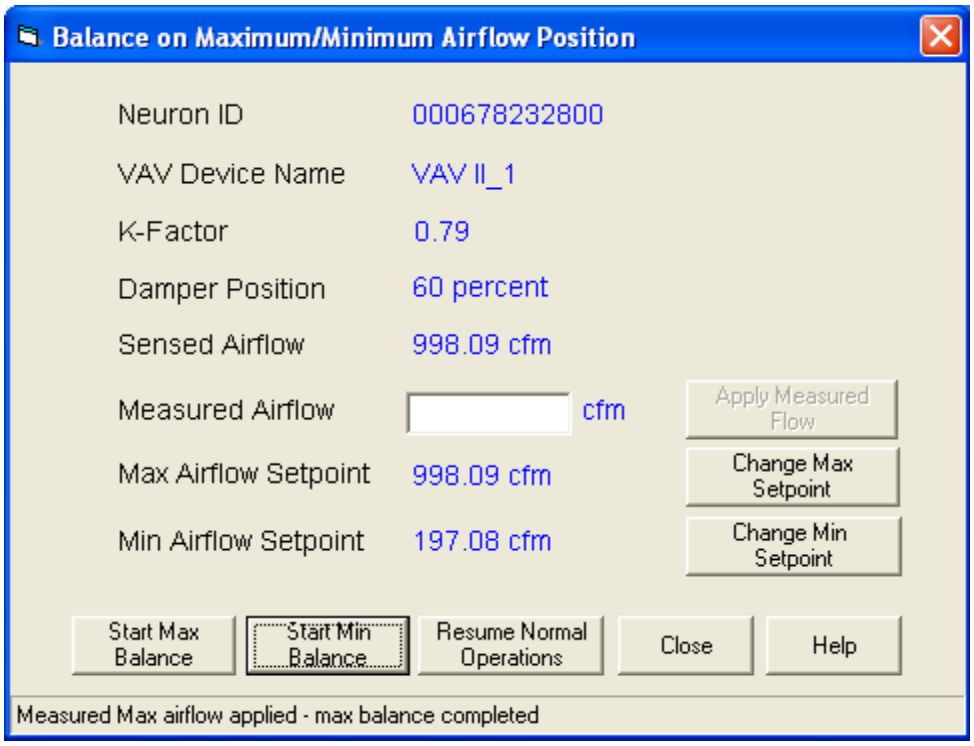

Fig. 9. Balance screen.

Steps to Balance to Maximum Airflow

NOTES:

- It is highly recommended to balance maximum airflow first. Balancing to minimum airflow before maximum airflow will result in less accurate results as maximum airflow balancing calculates a minimum airflow value. This calculated minimum airflow setpoint is often accurate enough so minimum balancing is not necessary.
- Balancing to maximum is required for every box; balancing to minimum is recommended for optimum accuracy but is not required.

1. Confirm maximum airflow setpoint.
2. If maximum airflow setpoint is not correct, user can change it by selecting the “Change Max Setpoint” button. See Fig. 10.
3. Select the button on the bottom of the screen, “Balance to Maximum Airflow”.
4. Damper position will begin to move open. Message on bottom of screen will state this.
5. Sensed airflow (the airflow being measured by the Excel 10 controller) will increase as damper position opens. The scroll at the bottom of the screen will show the progress of the maximum balancing.
6. Once the maximum setpoint is reached, the message at the bottom of the screen will prompt the user to enter the measured airflow, and the “Apply Measured Flow” button will become active.

   NOTE: Because of turbulence and real world influences, the measured airflow will not match the maximum airflow setpoint exactly.

7. Enter the numeric value of the measured airflow in cfm as measured by the flow hood at the VAV box.

   NOTE: If a proper airflow table has been downloaded to the controller, and barring excessive turbulence, the sensed airflow should be within at least 10% of the measured airflow. The manufacturer’s or custom airflow table is configured and downloaded using Honeywell CARE, E-Vision, or LONSPEC. Please see the authorized Honeywell contractor or field representative for details.

8. Press the button to the right of the Measured Airflow box titled “Apply Measured Flow” or press the <Enter> key.
9. The K-factor will update automatically once the Measured Airflow is entered. For a discussion on the K-Factor, please see Appendix: K Factor on page 20.

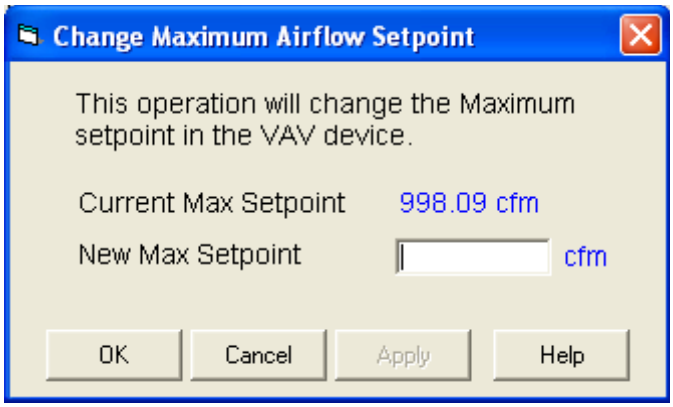

Fig. 10. Change Maximum Setpoint.

Steps to Balance to Minimum Airflow

NOTES:

- It is highly recommended to balance maximum airflow first. Balancing to minimum airflow before maximum airflow.
- Balancing to maximum is required for every box; balancing to minimum is recommended for optimum accuracy but is not required.

1. Confirm minimum airflow setpoint.
2. If minimum airflow setpoint is not correct, user can change it by selecting the “Change Min Setpoint” button. See Fig. 11.

   NOTE: Minimum airflow setpoint cannot be less than 50 cfm, otherwise erroneous airflow readings can occur.

3. Select the button on the bottom of the screen, “Balance to Minimum Airflow”.
4. Damper position will begin to move closed. Message on bottom of screen will state this.
5. Sensed airflow (the airflow being measured by the Excel 10 controller) will decrease as damper position closes. The scroll at the bottom of the screen will show the progress of the minimum balancing.
6. Once the minimum setpoint is reached, the message at the bottom of the screen will prompt the user to enter the measured airflow, and the “Apply Measured Flow” button will become active.

   NOTE: Because of turbulence and real world influences, the measured airflow will not match the minimum airflow setpoint exactly.

7. Enter the numeric value of the measured airflow in cfm as measured by the flow hood at the VAV box.

   NOTE: If a proper airflow table has been downloaded to the controller, and barring excessive turbulence, the sensed airflow should be within at least 10% of the measured airflow. The manufacturer’s or custom airflow table is configured and downloaded using Honeywell CARE, E-Vision, or LONSPEC. Please see the authorized Honeywell contractor or field representative for details.

8. Press the button to the right of the Measured Airflow box titled “Apply Measured Flow” or press <Enter>.
9. The K-factor will update automatically once the Measured Airflow is entered. For a discussion on the K-Factor, please see Appendix: K Factor on page 20.

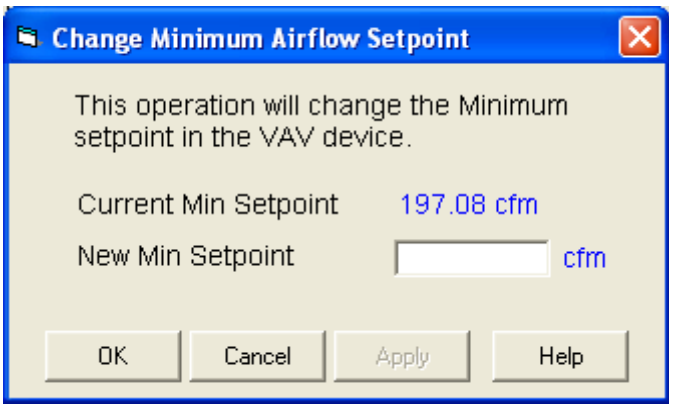

Fig. 11. Change Minimum Setpoint.

RAPIDBALANCE FEATURES AND FUNCTIONS

In addition to balancing, there are powerful features and functions within the RapidBalance tool.

Device Information

To the right of the “Balance” button, the “Device Info” button can be pressed to see information on a specific VAV. See Fig. 12.

The device information includes the neuron id and the VAV Device name. Additionally, information on the specific VAV application is listed such as single duct application, pressure independent, and reheat stages.

The duct diameter and duct area values that are downloaded to the Excel 10 VAV controller are displayed. If these values need to be modified, the user should contact an authorized Honeywell representative. Honeywell CARE, LNeX (for CARE systems), E-Vision, or LONSPEC respectively are the configuration and commissioning tools that can be used to make these changes.

The type of Flow Table is listed as either “Factory” or “Custom”. This gives the user some indication if the controller has the default or factory configured flow table, or if a more accurate custom or manufacturer specific flow table has been downloaded. In addition, the information page will indicate whether the controller has ever been balanced, or if the controller has been “zeroed”. The controller is zeroed in the factory to ensure zero flow at a zero damper position.

From the device information screen, the temperature setpoints can be changed directly by typing in the desired value and hitting “OK” (see Fig. 12 under “Temperature Setpoints” at the lower left portion of the screen).

On the upper right hand portion of the screen, the VAV box velocities (in fpm) are shown. These include the sensed values (the velocities “sensed” by the controller) as well as the measured values (the flows “measured” by a balancer in cfm and converted to fpm).

In the lower right hand portion, the air flow setpoints can be changed. The maximum and minimum air flow setpoints can also be changed from the balancing screen as described in the previous section. The Device Information screen allows the user to additionally change the Reheat and Standby airflow setpoints if so desired.

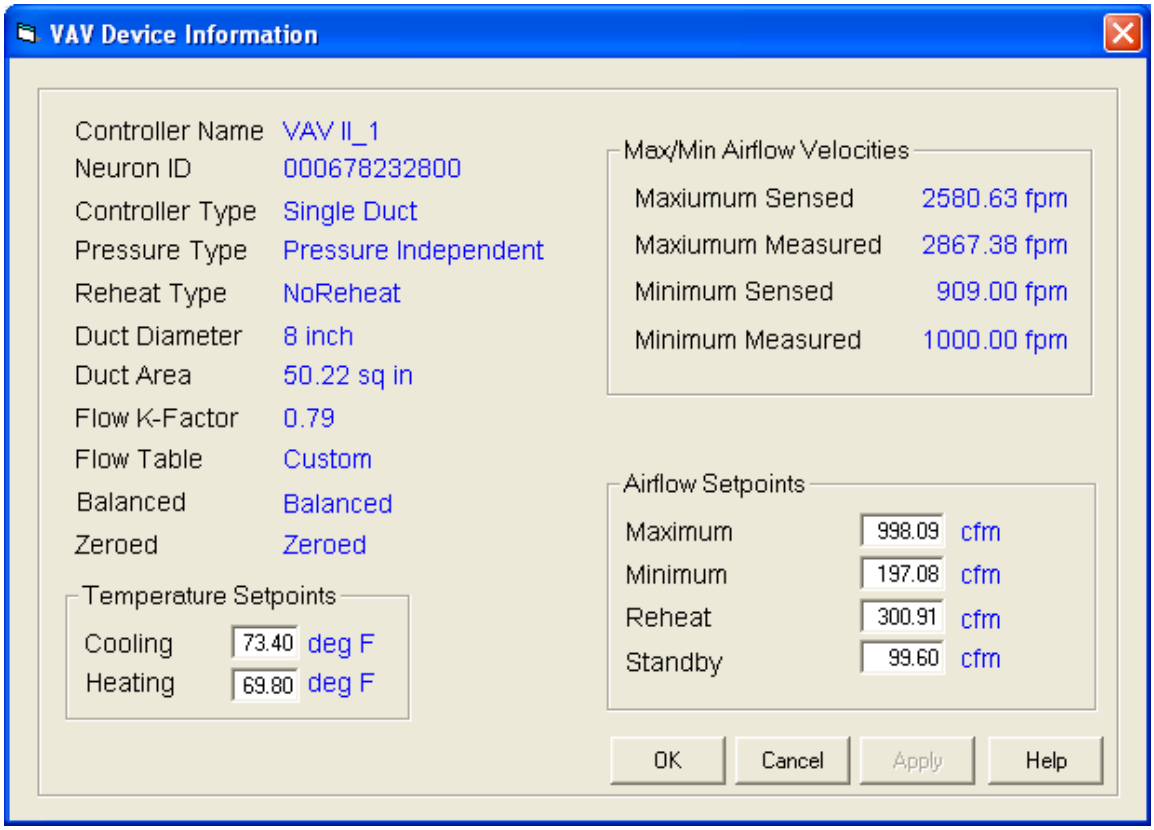

Fig. 12. Device info.

Move to Maximum/Minimum Airflow

The next button moving from left to right is the “Move to Maximum/Minimum Airflow” button. The same function can be launched from the Menu Item “Operation”, “Move to Maximum/Minimum Airflow”.

The user can select one or multiple VAV devices for this particular function. To select one or more than one VAV to move to maximum or minimum airflow, start from the main screen. To move one VAV to maximum or minimum airflow, highlight the desired VAV and click the “Move to Maximum/Minimum Airflow” button. To move more than one VAV’s, highlight the first VAV device name, then use the “Shift” or “Ctrl” key to highlight multiple VAV’s. The “Shift” or “Ctrl” key functionality follows standard Windows convention.

After selecting the VAV(s) desired, clicking on the “Move to Maximum/Minimum Airflow” button brings up the screen shown in Fig. 13.

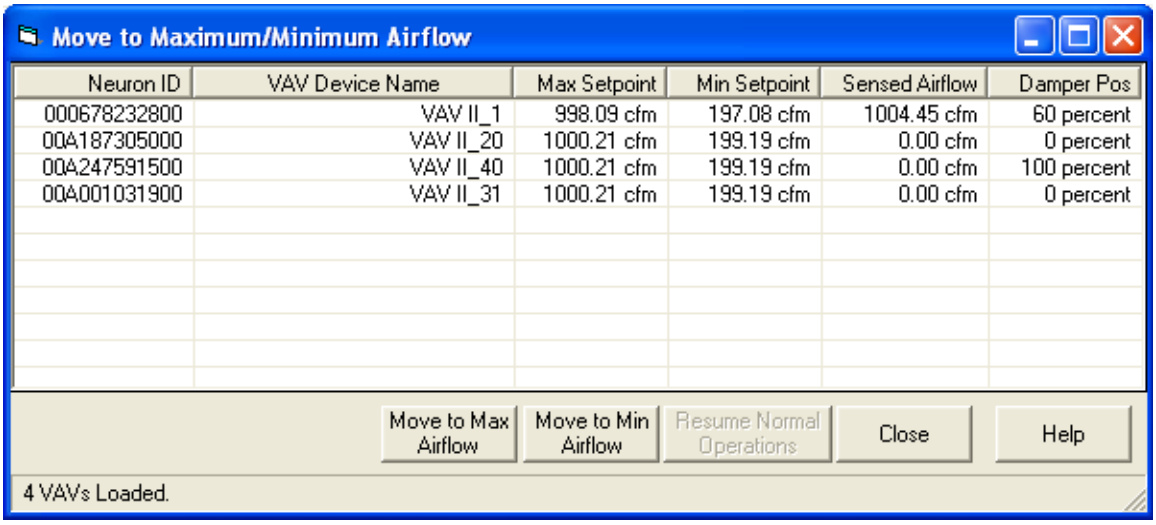

Fig. 13. Move to Maximum/Minimum Airflow.

From this screen, the user can specify “Move to Max Airflow” or “Move to Min Airflow”. Once the “Move to Max Airflow” button is selected, the VAV devices will drive toward maximum airflow setpoint. The damper will open until maximum flow is achieved. If the “Move to Min Airflow” is selected, the VAV devices will drive toward their minimum airflow setpoint.

At any time during these operations, the user can select “Resume Normal Operations” to remove the VAV devices from manual mode. The controller(s) will then go back to automatic mode and will control the VAV box per the controller application.

The user can use this functionality to move multiple VAV boxes to maximum, and isolate one VAV box to balance.

NOTE: The controller(s) will stay in manual mode until “Resume Normal Operations” is selected. If the user leaves the controller(s) in manual mode, a warning will appear when the user exits the RapidBalance program listing the devices that were left in manual mode (see Fig. 14).

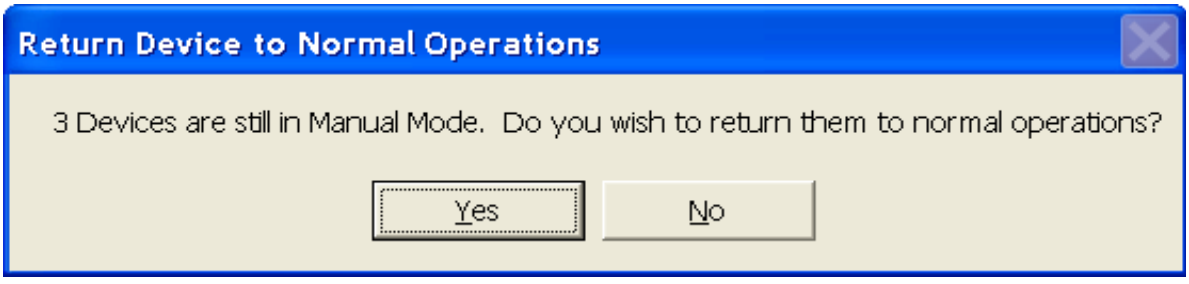

Fig. 14. Return Device to Normal Operations.

Move to Specific Damper Position

Several additional functions are available in RapidBalance beyond the buttons listed at the top of the screen. The user can select a specific VAV and move the Excel 10 VAV damper to a specific position by selecting “Operations” at the very top of the screen and then clicking on “Move to Specific Damper Position”. From this screen, an explicit value can be entered by the user. For example, if the user wanted to check the airflow at a minimum position, the user could set the damper to 25% or any value between 1 and 100%. Once the value is entered under “New Damper Position”, press “Move to New Damper Position” button to move the damper to that position. See Fig. 15. To put the controller back to automatic mode, click “Resume Normal Operations”. If this button is not clicked, the message shown in Fig. 14 will appear upon exiting the RapidBalance program.

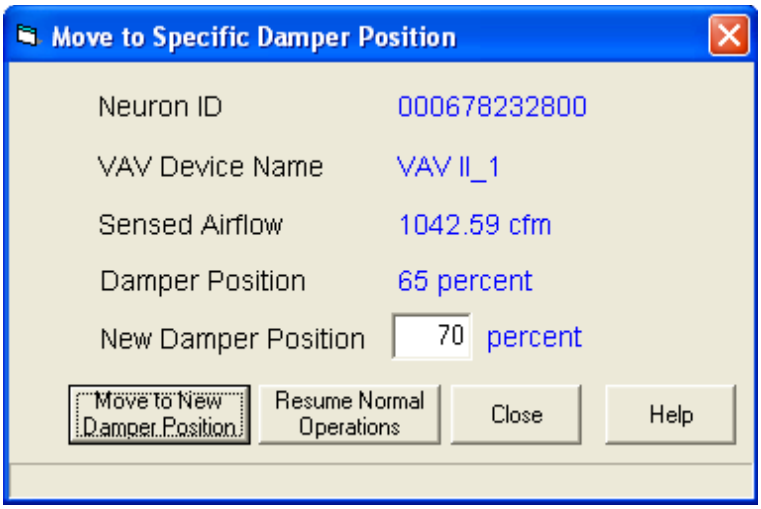

Fig. 15. Move to Damper Position.

Move to Airflow Position

A selected VAV controller can also be directed to move to a specific airflow position by entering a cfm value. The user can select a specific VAV and move the Excel 10 VAV damper to a specific flow by selecting “Operations” at the very top of the screen and then clicking on “Move to Airflow Position”. From this screen, an explicit value can be entered by the use in the “New Airflow Position” entry. For example, if the user wanted to check the damper position associated with a certain airflow, the user could direct the airflow position to anything between 50 cfm and 3500 cfm.

Once the value is entered under “New Airflow Position”, press the “Move to New Airflow Position” button to move the damper to that airflow. See Fig. 16. To put the controller out of manual mode back to automatic mode, click “Resume Normal Operations”. If this button is not clicked, the message shown in Fig. 14 will appear upon exiting the RapidBalance program.

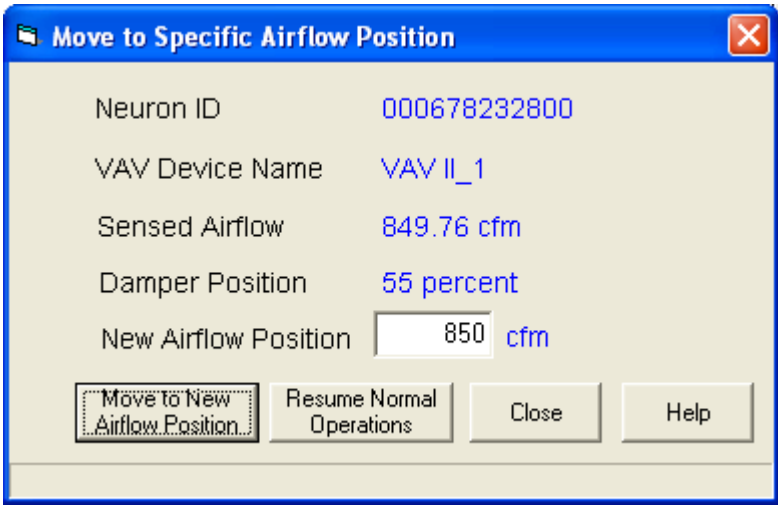

Fig. 16. Move to Airflow Position.

Calibrate Zero Airflow Position

At any time, a VAV box can be driven to the zero position to ensure zero sensed airflow at 0 damper position. This action can be achieved for an individual VAV by first selecting a specific VAV controller from the main screen. After the VAV device is selected, press “Operations” and then “Calibrate Zero Airflow Position”. The screen shown in Fig. 17 illustrates the information and buttons from this screen. To start driving the VAV box to zero, click “Start Zero Calibration”. The VAV box will then drive to zero.

NOTE: To take the VAV box out of manual mode, click “Resume Normal Operations”. If this button is not clicked, the user will be reminded to put the controller back to automatic mode when exiting the program (see Fig. 14).

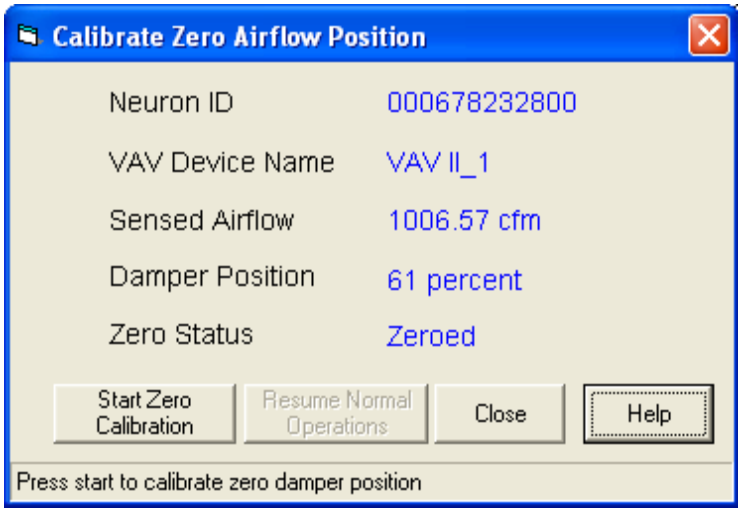

Fig. 17. Calibrate Zero Airflow Position.

RAPIDBALANCE REPORTS

The final menu item, “Reports”, contains a number of options of documenting the Excel 10 VAV system. See Fig. 18 for the drop down menu that is shown when “Reports” is selected. The user has the option of reporting information on:

- All VAV boxes
- Selected VAV boxes per highlighted rows
- VAV boxes that have been balanced
- VAV boxes that have not been balanced
- VAV boxes that have been zeroed
- VAV boxes that were not zeroed
- VAV boxes that were not configured by any Honeywell configuration program such as CARE, E-Vision, or LONSPEC (i.e., there is no application in the controller)

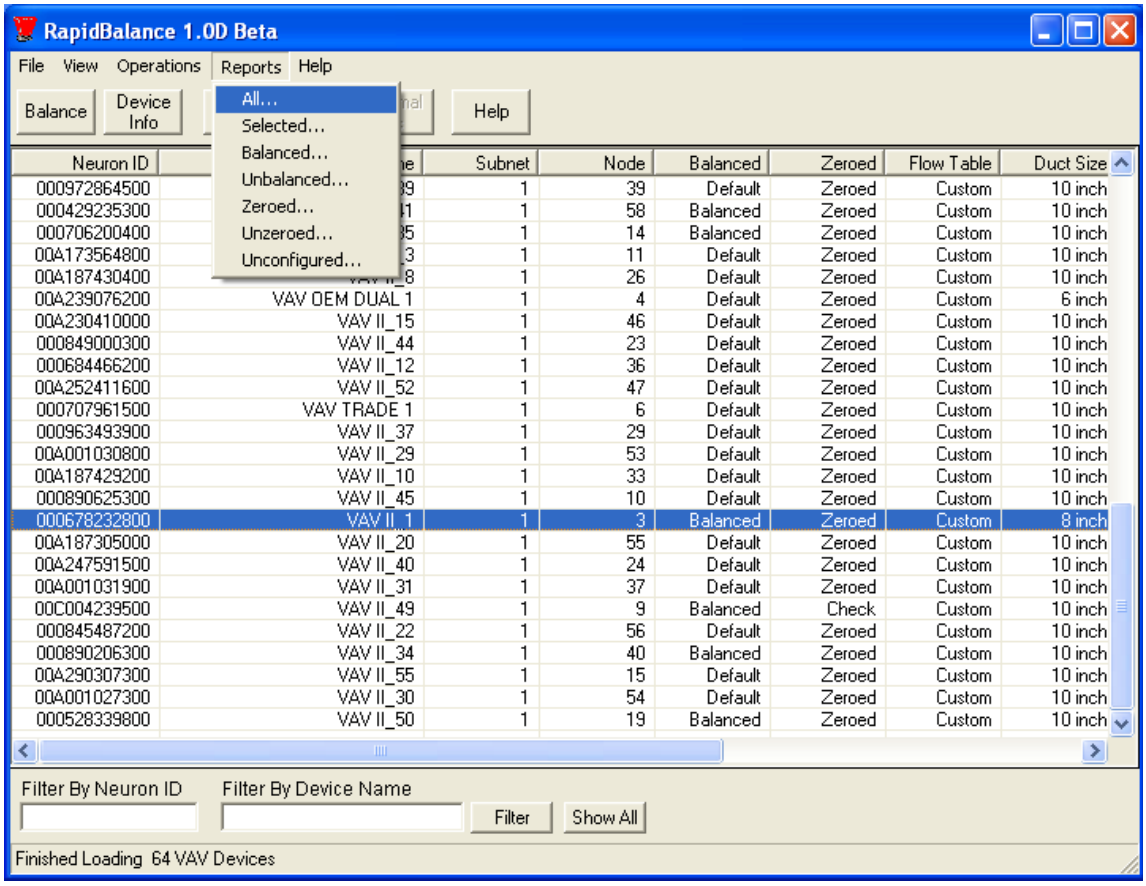

Fig. 18. Reports menu.

The reports show the information that is in the “Device Information” screen for every VAV device in a grid like fashion. (See “Device Information” on page 12.) The report can be exported to a .CSV file and saved on the user’s hard drive. The user can then use Excel to format and document the data for multiple uses.

For example, if the user needs to present the K-Factor on every VAV device that was balanced, the user can select “Reports” from the main screen and then “Balanced”. The K-Factor is noted for every VAV box.

The report has 20 columns of information on the VAV boxes. The following headings are the columns listed in a RapidBalance report (for definitions, please see Abbreviations and Definitions on page 2):

- Neuron ID
- VAV Device Name
- Subnet
- Node
- Balanced
- Zeroed
- Flow Table (lists Factory or Custom)
- Duct Size
- Duct Area
- K-Factor
- Max Sensed (maximum airflow sensed during balance)
- Max Measured (maximum airflow measured during balance)
- Min Sensed (minimum airflow sensed during balance)
- Min Measured (minimum airflow measured during balance)
- Max Setpoint
- Min Setpoint
- Reheat Setpoint
- Standby Setpoint
- Cool Setpoint
- Heat Setpoint

An example of a report is shown in Fig. 19.

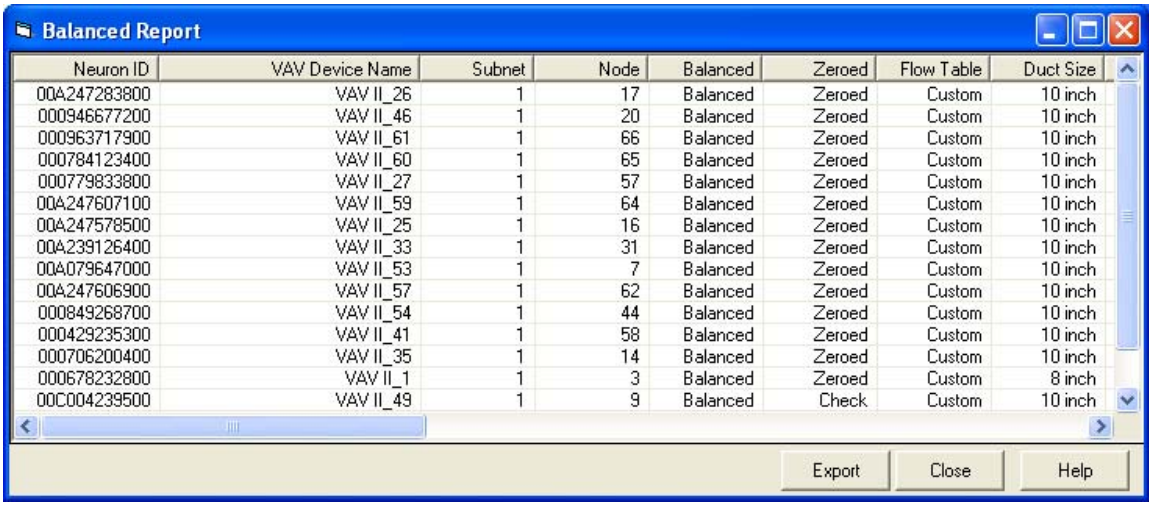

Fig. 19. VAV report.

To export the report to a .csv file, click the “Export” button at the bottom of the screen. RapidBalance will then prompt for the folder where the user wishes to save the report. A unique report name is generated for every report, showing the date and time stamp of the report that was generated. See Fig. 20 for an example. The report in the example is saved with a default name of “VavReport-20030904-170351.csv”. This represents a date and time stamp of September 4th, 2003, at 5:03:51 PM. The user can change the name of the file as the user wishes.

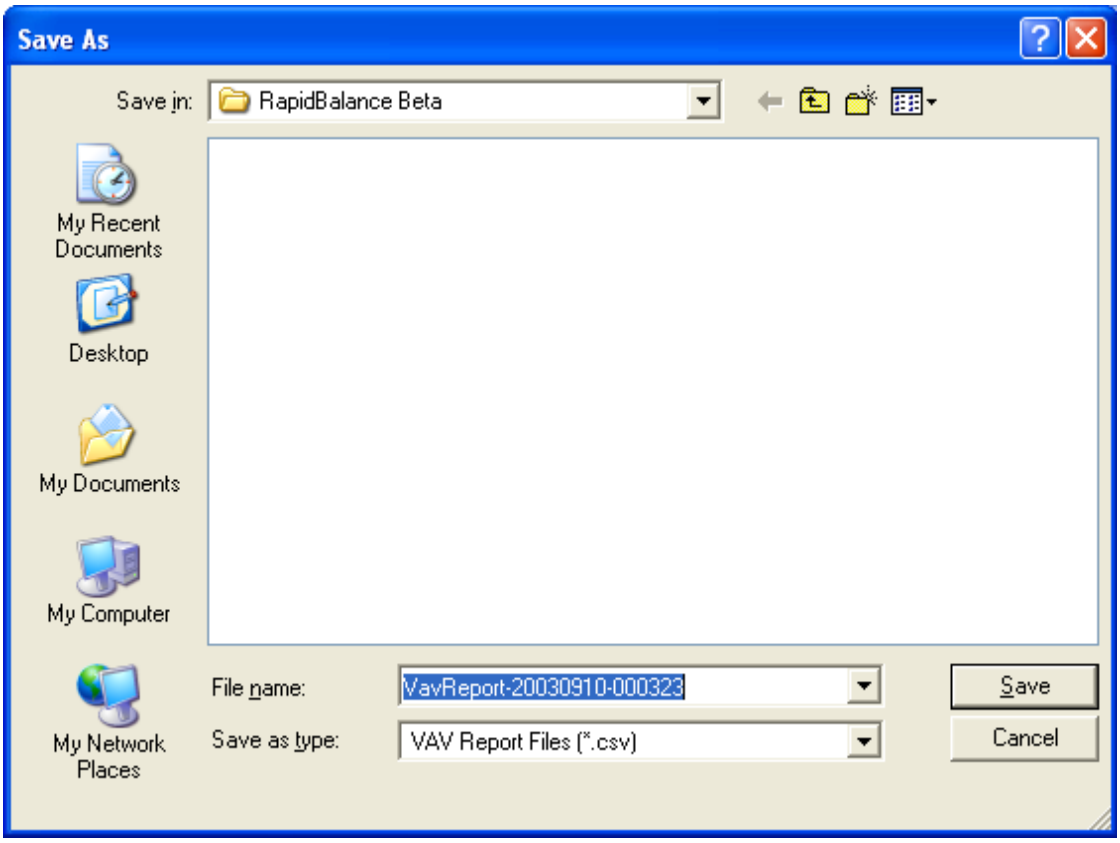

Fig. 20. Report .CSV default name.

ON-LINE HELP

RapidBalance has an On-Line Help guide to assist the user when RapidBalance is being used at a job. The On-Line Help follows standard Windows Help File conventions, and has an index as well as find feature. The user can access the On-Line Help by clicking the “Help” button, or by selecting the menu item “Help”. See Fig. 21 for the current On-Line Help Topics.

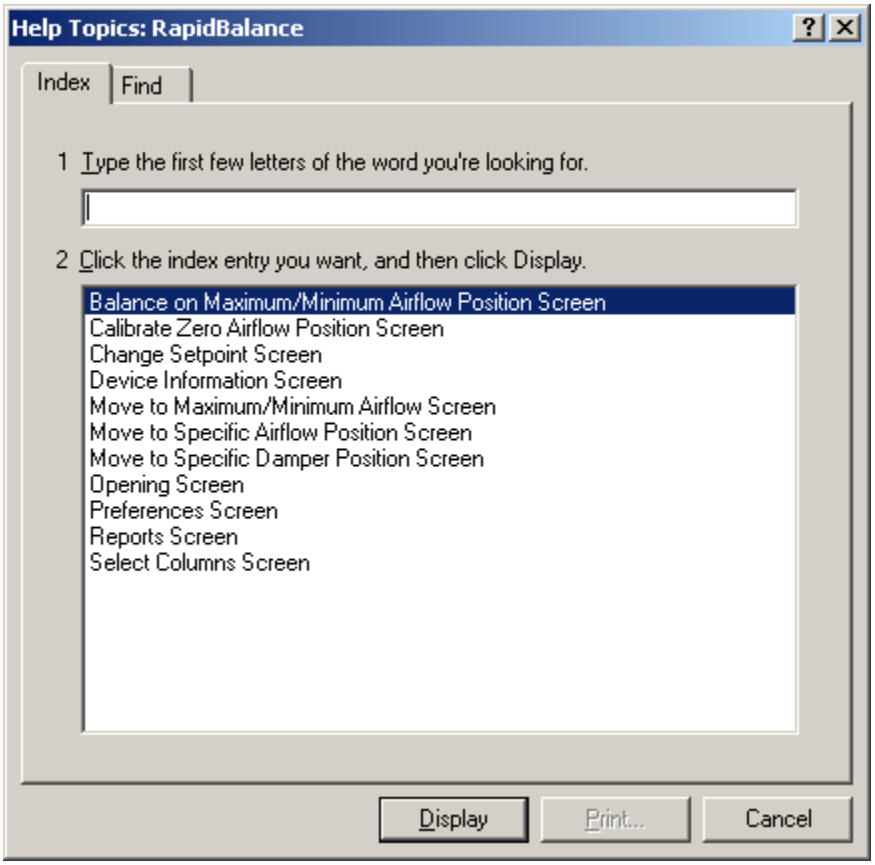

Fig. 21. On-Line help.

TROUBLESHOOTING

The following question and answers are a general troubleshooting guide.

Why Doesn't RapidBalance See My Network?

Check the following:

- Check to make sure the correct Echelon drivers for the LonTalk Adapter is loaded on the PC.
- Check that the cable is connected to the proper jack on the Excel 10 VAV, or that the wires are connected to the proper terminals.
- Ensure RapidBalance is looking for the correct LonTalk Adapter. See Connecting via LonWorks Network Interface on page 5 as well as Selecting File Preferences on page 7.
- Ensure the correct domain is set if it is a CARE 4.0 application. Have the Honeywell Authorized Technician/ Contractor check the CARE project. See Selecting File Preferences on page 7.
- If the PC also has CARE 4.0 loaded, make sure the NI settings in LONWORKS Plug 'n Play are correct for RapidBalance. This program is found by clicking the "Start" menu on the PC and accessing the Control Panel. The program is called LONWORKS Plug 'n Play. Double click on the program, and make sure the NI setting matches the screen in Fig. 22. CARE defaults to a setting of PCC10VNI.

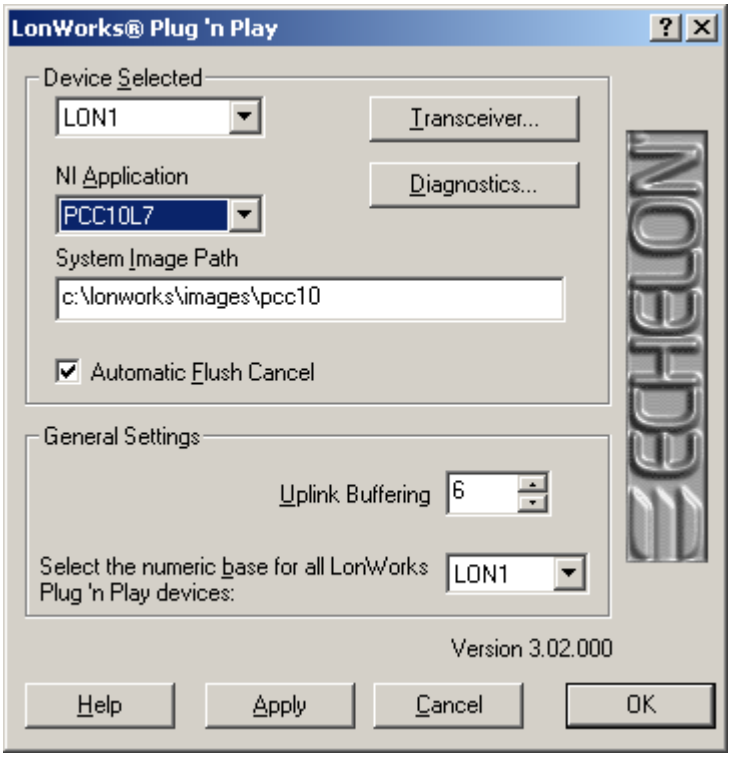

Fig. 22. LONWORKS Plug 'n Play.

Measured Flow is Significantly Different from Sensed Flow

- What are the Possible Causes?

- Check with the Authorized Honeywell Technician/ Contractor that the correct airflow table has been downloaded. These tables are manufacturer specific, or can be custom input, through LONSPEC, CARE 4.0, or E-Vision.
- Check with the Authorized Honeywell Technician/ Contractor that the correct duct size has been downloaded. The duct size is input through LONSPEC, CARE 4.0, or E-Vision.
- Check the main air handling unit for possible issues with the fan.
- Determine if there could be unusual turbulence in the duct.
- Perform a Zero Calibration (See "Calibrate Zero Airflow Position" on page 15.)

Names on the Main Screen Appear Garbled

- Check the cable and ensure integrity throughout the connection from the laptop, LonTalk Adapter, and the network.

APPENDIX: K FACTOR

Sensing Airflow begins with the sensing of the pressure within the airflow stream. In its simplest form, the measurement of airflow involves the sensing of the upstream pressure (referred to as the total system pressure), and the sensing of the system static pressure.

The airflow-sensing device includes a mechanism that gathers and transmits the upstream pressure of the airflow. This device usually incorporates a group of openings that point upstream and allows the total system pressure to enter. The multiple openings in the upstream sensor are intended to provide an overall average of the upstream pressure. The second mechanism included in the airflow sensing device gathers and transmits the downstream or static pressure. This second mechanism sometimes incorporates more than one opening. By subtracting the downstream pressure from the upstream pressure, a new pressure called velocity pressure is created.

The information transmitted by the device does not allow the actual value of the pressure to be calculated. In order to utilize this information, it must be converted into a value that represents the actual velocity pressure. Velocity pressure is easily determined by attaching a simple mechanical gauge that will measure the difference between the two pressures and provides a value representing this difference.

If a plot is made of the velocity pressure vs. the actual velocity, a graph can be created. Often this chart is supplied by the VAV box manufacturer in the Installation literature. The chart plots the resultant velocity as the pressure is varied between 0.0 and typically 1.0 inches of H2O. This relationship is not a linear function.

The relationship between velocities vs. pressure is in fact a function of the square root of the velocity pressure. This square root relationship means that simple linear interpolation between pressure and velocity will produce unreliable results. If a pressure of 0.1 inches of H2O is located on the chart in Fig. 3, which represents 10 percent of the pressure range, a corresponding velocity is located representing a little over 1000 fpm or 25 percent of the flow range. If a linear relationship had been applied to the same chart only 400 fpm would have been calculated. The square root relationship can be expressed as an equation:

$$V = 4005 \times \sqrt{Vp}$$

where: V = Velocity in feet per minute
and Vp = Velocity Pressure in Inches of Water

The equation represents a method for calculating the ideal velocity of air as a function of the square root of the velocity pressure. With the application of airflow sensing in the real world a correction must be included in the equation to account for differences between the ideal velocity and the real velocity. The modification equation takes the form:

$$V = 4005 \times K \times \sqrt{Vp}$$

where: V = Velocity in feet per minute
Vp = Velocity Pressure in Inches of Water
and K = VAV Terminal Scaling factor

The scaling factor included in the new equation becomes unique to each VAV Terminal type. Most VAV Terminal manufactures include this scaling factor in their documentation. This factor must be included in any velocity calculations for the end result to represent the actual velocity sensed.

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