



TAC I/A Series Micronet VAV Flow Balance User's Guide



FCC

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Preface

Purpose of Manual

This manual contains instructions for air balancing terminal boxes controlled by TAC I/A Series MicroNet VAV Controllers. To use this manual effectively, you should be a trained, experienced air balancer. Also, you should be familiar with Windows®95 and the TAC I/A Series MicroNet family of components.

Abbreviations Used in this Manual

BIOS	Basic input output system
cfm	Cubic feet per minute
FTT	Free Topology Transceiver
L/s	Liters per second
LED	Light emitting diode
LON®	Local Operating Network
MB	Megabyte
PC	Personal computer
RAM	Random access memory
S-LK	Sensor Link
VAV	Variable air volume

Text Marking Conventions Used in this Manual

The illustrations, task instructions, and descriptions in this manual use the following text marking conventions:

- Key names are shown as unbolded, uppercase: ENTER, ALT, F1.
- Menu choices, field titles, and window button labels appear exactly as shown on your screen: Save as, Open, OK.
- Text typed in a text entry field is shown in bold: **500cfm**.
- Commands on submenus are identified by referring to both the submenu and the command name. For example, the Rotation Check command on the Verify submenu is referred to as Verify>Rotation Check.

Keyboard Commands

The TAC MicroNet VAV Flow Balance interface works best with a mouse. Its dialog boxes, menus, and edit boxes accommodate the mouse's speed and maneuverability. However, you can use these keyboard commands instead of mouse commands:

- To open and choose from a menu: Press ALT and the underlined letter in the menu title simultaneously. For example, press ALT-F to open the File menu. Then press the arrow key to move to the menu choice you want to open. Press ENTER to open that menu choice.
- To maneuver and choose in a dialog box: Press TAB to move through the elements of the dialog box (buttons and fields). Use the arrow keys to move up or down any lists that open within the dialog box. Press ENTER to choose a highlighted option.

Applicable Documentation

F-Number	Description	Audience	Purpose
F-26365	MNL-V1R Series and MNL-V2R Series, TAC I/A Series MicroNet Variable Air Volume Controller Specification Data Sheet	<ul style="list-style-type: none"> – Sales Personnel – Application Engineers 	Describes features and specifications of the TAC I/A Series MicroNet MNL-V1R & MNL-V2R VAV Controllers.
F-26282	MNL-V1R Series and MNL-V2R Series, TAC I/A Series MicroNet Variable Air Volume Controller Installation Instructions	<ul style="list-style-type: none"> – Application Engineers – Installers – Start-up Technicians – Service Personnel 	Provides step-by-step installation and checkout procedures for these controllers.
F-26290	MN-SX Series, TAC I/A Series MicroNet Sensor Specification Data Sheet	<ul style="list-style-type: none"> – Sales Personnel – Application Engineers 	Describes features and specifications of the TAC I/A Series MicroNet Sensors.
F-26277	MN-SX Series, TAC I/A Series MicroNet Sensor General Instructions	<ul style="list-style-type: none"> – Application Engineers – Installers – Start-up Technicians – Service Personnel 	Provides step-by-step installation and checkout procedures for these sensors.

Manual Summary

This manual contains three chapters and an appendix.

Chapter 1 - About Flow Balance

This chapter introduces the TAC MicroNet VAV Flow Balance software and lists required equipment and conditions.

Chapter 2 - Getting Started

This chapter explains terminology and concepts associated with the TAC MicroNet VAV Flow Balance software. It also gives setup and installation instructions.

Chapter 3 - Air Balancing

This chapter contains instructions for using the TAC MicroNet VAV Flow Balance software to air balance terminal boxes controlled by TAC I/A Series TAC MicroNet VAV Controllers. It includes sections on basic procedures and air balancing procedures.

Appendix A - Troubleshooting

This section offers information for diagnosing and troubleshooting problems. It includes causes and corrective actions.

Chapter 1

About Flow Balance

The TAC MicroNet VAV Flow Balance software (MNL-FLOW-BAL) is used to air balance terminal boxes controlled by TAC I/A Series MicroNet VAV Controllers (MNL-V1RVX and MNL-V2RVX).

TAC I/A Series MicroNet VAV Controllers

These controllers are interoperable, LONMARK[®]-compliant devices which provide a wide range of control strategies for pressure independent terminal boxes with, or without, reheat capabilities. Both the MNL-V1RVX and the MNL-V2RVX models provide an integral actuator with manual override, an integral patented pressure transducer, S-LK support, onboard LED indication, and over-the-shaft damper mounting. In addition, the MNL-V2RVX model provides one analog output and three digital outputs. These controllers can function either in a stand-alone mode or as part of a local operating network (LON) via the LONWORKS[®] FTT-10 Free Topology communication network.

Required Equipment

Table–1.1 Required Air Balancing Equipment.

Requirement		Description
Platform	PC Type	Pentium [®] PC (desktop or laptop)
	Operating System	Windows 95
	RAM	16MB required (24MB recommended)
	Disk Drives	Hard disk with 8MB free space
	Monitor	Super VGA monitor or better
Echelon Cards		<ul style="list-style-type: none"> • Desktop: Echelon[®] PCLTA-10 PC-ISA card with driver software and cable (TAC part number WPA-LON-1) • Laptop: Echelon PCC-10 PCMCIA card with driver software and cable (TAC part number WPA-LON-2)
Other		<ul style="list-style-type: none"> • TAC I/A Series MicroNet VAV Controller (MNL-V1RVX or MNL-V2RVX only) • External air flow hood • Terminal box specifications • Job diagrams and specifications • Echelon network wire • LON Terminators

Required Conditions

- The operator of the TAC MicroNet VAV Flow Balance software must be a trained, experienced air balancer.
- The LON must be configured prior to air balancing.
- An Echelon card and appropriate driver software must be installed prior to air balancing.
- The central air handling unit (AHU) should be operating and supplying a minimum of 2.00" (498 Pa) of static pressure to the terminal box.
- If the terminal box being balanced is controlled by a TAC I/A Series MicroNet VAV Controller that is networked in an active smoke control or other emergency control strategy that uses nviEmergCmd, air balancing cannot occur except in the normal control state.
- If your PC has a power management setting in its basic input/output system (BIOS), it must be disabled before you start air balancing. Consult PC documentation for more information.

Chapter 2

Getting Started

Overview

This chapter explains terms and concepts associated with the TAC MicroNet VAV Flow Balance software. Physical setup and software installation instructions are also provided.

Understanding the Software

This section defines common concepts and terms associated with the Flow Balance software.

Definitions

Document

When you begin an air balancing job using the Flow Balance software, you start by creating a new document. Next, you establish communication with controllers you want to balance by locating them on the LON and adding them to the document. You can add up to fifteen devices. The number of devices you add to a document depends on the job specifications. If you need to air balance more than fifteen devices, you will have to create multiple documents.

Proceed by air balancing each of the connected controllers. If you need to pause during air balancing, you can save the document. When you reopen it, the document will automatically reestablish communication with all connected controllers, and you can resume air balancing.

When you are finished air balancing, you can save the document as a record of the job. Documents store information necessary to reestablish communication with connected controllers.

Device

Device refers to a TAC I/A Series MicroNet VAV controller. In this manual, the terms device and controller are synonymous. Controllers that have been added as devices to a document are represented by a main information panel which displays information about the associated controller such as current operating setpoint, controller status, controller name, etc.

On- and Off-Line Functions

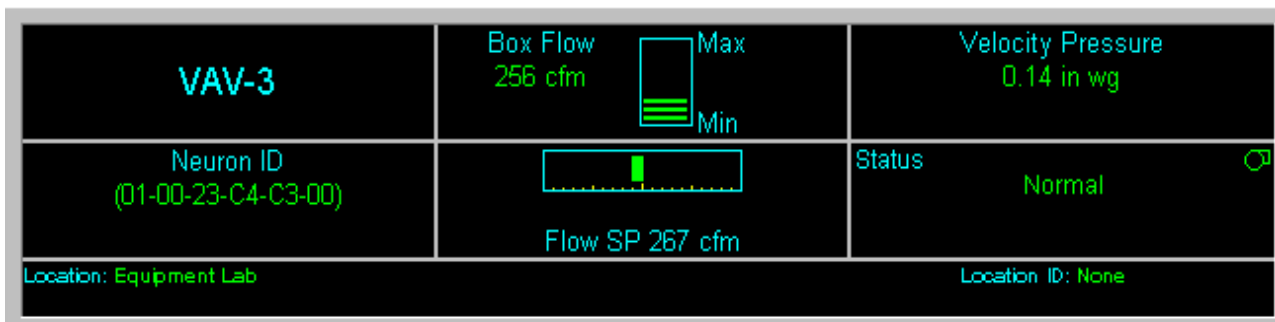
Some menu selections are operational only when the TAC MicroNet VAV Flow Balance software is communicating with a device. These on-line functions. On-line functions allow you to view and modify values associated with the currently connected devices.

Other menu selections operate regardless of whether or not the software is communicating with a device. These are off-line functions. Off-line functions consist of viewing Help windows and modifying software configuration.

Interface

The Main Information Panel

The Flow Balance software contains one information panel per connected device. The panel contains information about the associated device. Figure–2.1 shows a typical main information panel and Table–2.1 explains each of its components.



Figure–2.1 Main Information Panel.





Table–2.1 Explanation of Main Information Panel.

<p>Controller name Entered by user in MNL-FLOW-BAL software.</p>	<p>Box flow Determined by the sensed pressure and the assigned calibration values.</p> <p>Bar Shows box flow value in relation to maximum and minimum flow setpoints.</p>	<p>Velocity pressure in inches w.g. Displays pressure sensed by the controller pressure transducer.</p>
<p>Neuron identification number Unique number assigned to controller during manufacturing.</p>	<p>Bar Shows box flow in relation to setpoint with plus or minus offsets.</p> <p>Current flow setpoint During normal operation, this value reflects the controller’s current flow setpoint. During air balancing, this value reflects the setpoint forced by the MNL-FLOW-BAL software.</p>	<p>Current status window Displays current status prompts, an emergency override icon, fan icons, and a communication error message.</p>
<p>Physical location descriptor This value is read from the controller.</p>	<p>Location identification number This value is read from the controller.</p>	

Current Status Window

The current status window is part of the main information panel. It displays the current status of the connected device, user prompts, an emergency override icon, current and override fan icons, and communication error messages. For more information about the emergency override icon and communication error messages, see Appendix A. See Table–2.2 for an explanation of the fan icons.

Table–2.2 Fan Icons.

Appearance	Color	Status
Solid 	Red	Override to on
Hollow 		Override to off
Solid 	Green	On during normal operation
Hollow 		Off during normal operation

Log files

To View Log Files

When you save a flow document, a log file is automatically generated and saved in the same directory. The log file contains a complete record of tasks performed by the Flow Balance software. A log file is a text file that can be opened in a text editor such as WordPad®. Double click on the log file to open.

To Print Log Files

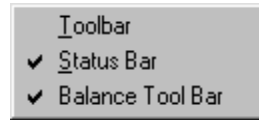
For printing instructions, consult documentation associated with the text editor you are using to view the log file.

Status and Tool Bars

The Flow Balance software has one status bar and two tool bars.

To Display Or Hide Status And Tool Bars

Select **V**iew and highlight your selection (Figure–2.2). If the bar has a checkmark next to it, it is already displayed. If the bar has no checkmark, it is hidden. In Figure–2.2, the Toolbar and the Status Bar are displayed. The Balance Tool Bar is hidden.



Figure–2.2 View Menu.

The Status Bar

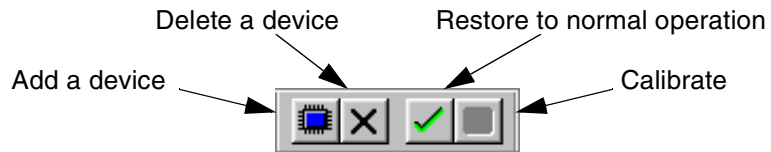
The Status Bar (Figure–2.3) provides the version number of the software and explains the function or purpose of the task, button, menu, etc. currently indicated by the cursor. The Status Bar appears at the bottom of the Flow Balance software window.



Figure–2.3 The Status Bar.

The Balance Tool Bar

The Balance Tool Bar (Figure–2.4) has four buttons with icons for quick access to air balancing tasks.



Figure–2.4 Balance Tool Bar.

The Toolbar

The Flow Balance software uses standard toolbar icons for quick access to common commands. From left to right, the icons below (Figure–2.5) allow you to create a new document, open an existing document, save a document, print a document, and get information about TAC MicroNet VAV Flow Balance software.



Figure–2.5 Toolbar.

Setup

This section explains how the PC with installed TAC MicroNet VAV Flow Balance software is connected for communication with the LON.

Note: For more information, see *TAC I/A Series MicroNet VAV Controller Installation Instructions*, F-26282 and *TAC I/A Series MicroNet Sensor General Instructions*, F-26277.

Prior to air balancing, the PC must be properly connected to a TAC I/A Series MicroNet VAV Controller or TAC I/A Series MicroNet Sensor as described below.

- The terminals on the PC's Echelon card can be wired directly to the controller's LON terminals.
- The PC can also be connected to the controller via the LON jack of sensor if the sensor is wired for LON communications. The PC can be plugged into the sensor's LON Jack to gain local access to the LON. The appropriate cables and plugs are included with desktop or laptop Echelon cards (See Table-1.1).

Installation Instructions

The TAC MicroNet VAV Flow Balance software uses InstallShield® for installation.

To Install

1. Insert the floppy disk labelled MNL-FLOW-BAL Disk 1.
2. Double click on setup.exe.
3. Follow prompts as directed.

Chapter 3

Air Balancing

Overview

This chapter contains instructions for using the TAC MicroNet VAV Flow Balance software to air balance terminal boxes controlled by TAC I/A Series MicroNet VAV Controllers (MNL-V1RVX and MNL-V2RVX).

The information in this chapter is organized into Basic Procedures and Air Balancing Procedures. Basic procedures include instructions for working with documents and devices. Air balancing procedures include calibration instructions and instructions for performing other air balancing tasks.

The TAC MicroNet VAV Flow Balance software automates most of the air balance procedure. If the terminal box has a fan or reheat, the software stops in certain places to allow you to manually set fan speed or reheat minimum air flow and then resume operation.

Basic Procedures

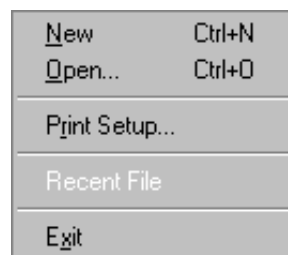
This section provides instructions for working with documents and devices.

Documents

To Create a New Document

Note: Create a new document when you start a job. A document holds up to fifteen devices which are represented within the document as main information panels. If the job has more than fifteen controllers, you will need to create more than one document.

1. Choose New from the File menu (Figure–3.1).



Figure–3.1 File Menu.

2. Choose Save from the File menu (Figure–3.2) and name the document.

To Open an Existing Document

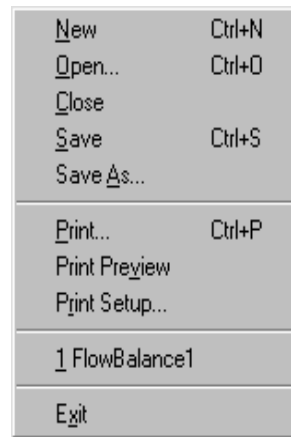
Note: When you open a document that has previously been saved and closed, the document automatically reestablishes communication with connected devices.

1. Choose Open from the File menu (Figure–3.1).
2. Select the document you want to open.
3. Double click or click Open.

To Save a Document

Note: Documents can be saved and reopened. For example, if you need to pause during air balancing, you can save the document and reopen it at a later time.

1. Select Save from the File menu (Figure–3.2).

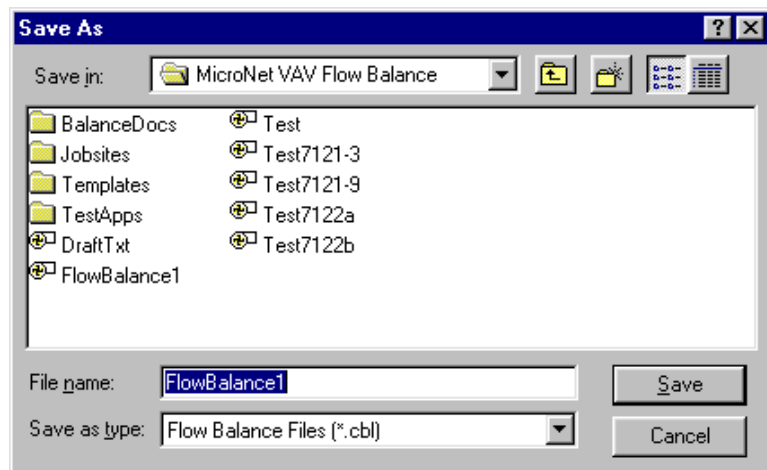


Figure–3.2 Expanded File Menu.

- If you have previously saved the document, you will not see a dialog box. After selecting Save, you are finished.
 - If you have not previously saved the document, the Save As dialog box will appear. Proceed to Step 2.
2. If the Save As dialog box appears, choose where you want to save the file
 3. Name the file.
 4. Click Save.

To Use the Save As Command

1. Select Save As from the File menu (Figure–3.2).
The Save As dialog box appears (Figure–3.3).



Figure–3.3 Save As Dialog Box.

2. Choose where you want to save the file.
3. Name the file.
4. Click Save.

To Close a Document

Select **C**lose from the **F**ile menu (Figure–3.2) or click the X in the upper right hand corner of the document.

To Set Up Printing

Note: During air balancing, you can print out a configuration values sheet. This sheet lists the name of each controller in the document and also provides the controller’s neuron ID, location ID, and configuration values such as maximum flow setpoint, minimum flow setpoint, minimum flow heat setpoint, minimum flow standby setpoint, high flow calibration setpoint, low flow calibration setpoint, parallel fan setpoint, and direction of rotation.

Select **P**rint Setup from the **F**ile menu (Figure–3.2). The Print Setup dialog box appears. The appearance of this dialog box varies depending on the printer driver installed on your system. Typically, the print setup dialog box allows you to choose printer, paper size, paper orientation, and paper source. For more information, consult the documentation associated with your printer driver.

To Preview Printing

Select **P**rint **P**review from the **F**ile menu (Figure–3.2). The Print Preview dialog box appears. The appearance of this dialog box varies depending on the printer driver installed on your system. For more information, consult the documentation associated with your printer driver.

To Print a Configuration Values Sheet

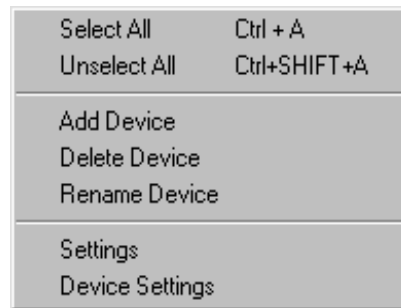
Select Print from the Eile menu (Figure–3.2). The Print dialog box appears. The appearance of this dialog box varies depending on the printer driver installed on your system. For more information, consult the documentation associated with your printer driver.

Devices

To Add a Device

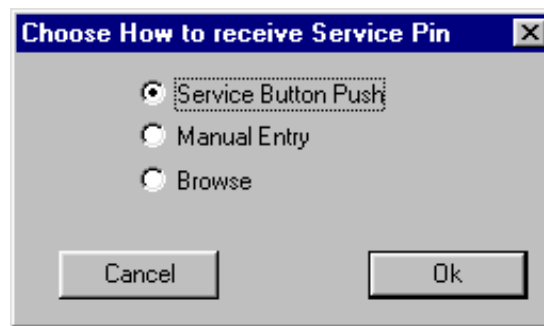
Note: Adding a device prompts the TAC MicroNet VAV Flow Balance software to establish communications with a controller. Typically, you add a device to a document before you begin air balancing.

1. Choose Add Device from the Edit menu (Figure–3.4) or click on the appropriate icon on the balance tool bar (Figure-2.4).



Figure–3.4 Edit Menu.

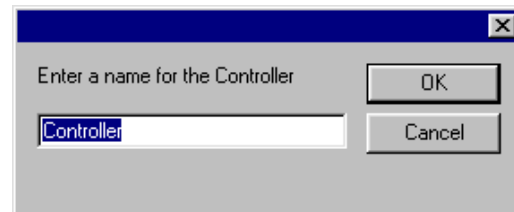
A dialog box labelled “Choose How to Receive Service Pin” appears (Figure–3.5).



Figure–3.5 Choose How to Receive Service Pin Dialog Box.

2. Click the circle next to the method you want to use to receive the service pin. Choose one of the following:
 - Service Button Push: When you push the controller’s service pin, the device sends a LonTalk broadcast message containing its Neuron ID and program ID and establishes communications between with the software.
 - Manual Entry: You can establish communication between the controller and the software by manually entering the device’s neuron ID. Consult your job diagrams.

- Browse: Choosing Browse prompts the software to list all devices on the LON. Choose the correct neuron ID.
3. After the controller and software are communicating, the Controller Name dialog box appears (Figure–3.6). The name you assign to the controller with the software is strictly for your identification purposes during air balancing. Type in the device name.



Figure–3.6 Controller Name Dialog Box.

4. Click OK.
5. Click DONE.

To Delete a Device

Note: The TAC MicroNet VAV Flow Balance software lets you delete devices from the document. Deleting a device stops communication between the controller and the software. For example, if a controller had to be physically replaced after you had added it to the document, you would need to delete the device from the document and establish communication with the replacement controller.

1. Highlight the device you want to delete.
2. Choose Delete Device from the Edit menu (Figure–3.4) or click on appropriate icon on the balance tool bar (Figure-2.4).

To Rename a Device

Note: The TAC MicroNet VAV Flow Balance software allows you to name each controller when you add it to the document as a device. The name assigned to a controller with the software is strictly for your identification purposes during air balancing.

1. Highlight the device you want to rename.
2. Select Rename Device from the Edit menu (Figure–3.4).
3. Enter new controller name(s) and click OK.

To Select All

Note: If you want to perform an air balancing procedure on multiple devices in one document, use the select all command.

Choose Select All from the Edit menu (Figure–3.4). All devices in the current document will be selected.

To Unselect All

Choose Unselect All from the Edit menu (Figure–3.4). All devices in the current document will be unselected.

Air Balancing Procedures

“Air Balancing Procedures” has three sections.

- The first section, “Configuration,” contains instructions for setting air balancing parameters such as display units, setpoint range, and equipment settings.
- The second section, “Calibration,” contains step-by-step instructions for performing rotation checks, maximum flow calibration, minimum flow calibration, reheat minimum flow setpoint adjustment, standby minimum flow setpoint adjustment, parallel fan setpoint adjustment, and manual fan adjustment.
- The third section, “Individual Commands,” contains instructions for manipulating VAV functions individually.

Configuration

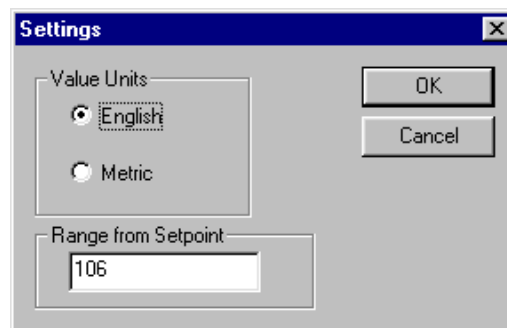
These instructions explain how to configure your controller(s) prior to air balancing. They include display unit selection, setpoint range specification, and adjustment of device settings including calibration values, overrides, and heat settings. A controller can be configured within an active document after it has been added to the document as a device.

To Select English or Metric Display Units

This setting determines how measurements are displayed in the main information panel, dialog boxes, and log files. English units refers to cubic feet per minute (cfm), and metric units refers to liters per second (L/s).

Note: If you configure the TAC I/A Series MicroNet VAV Controller to display English units, a display error of +/-1 may occur when you view air flow setup parameters such as maximum and minimum flow control points.

1. Highlight the device you want to configure.
2. Choose Settings from the Edit menu.
The Settings Dialog Box appears (Figure–3.7).



Figure–3.7 Settings Dialog Box.

3. Specify display units in English or metric.
4. Click OK.

To Specify Setpoint Range

Note: This setting determines the acceptable amount of deviation from the setpoint displayed during calibration. For example, if maximum flow setpoint is 500cfm and job specifications require +/-50cfm accuracy, you would type in **50** in the Range from Setpoint field. During calibration, the software will indicate the device is in range if maximum flow is within 50cfm of the setpoint.

1. Highlight the device you want to configure.
2. Choose Settings from the Edit menu (Figure–3.4).
The Settings Dialog Box appears (Figure–3.7).
3. Enter the acceptable amount of setpoint deviation in the Range from Setpoint field (Figure–3.7).
4. Click OK.

To Edit Device Settings

Note: Adjustable device settings include flow setpoints, calibration values, overrides, and heat configuration. You can edit the device settings of any connected device. The figure below (Figure–3.8) shows where you can make adjustments.

Setpoints		
Minimum Flow	Maximum Flow	
150	500	
Minimum Flow Heat	Minimum Flow Stand	
199	100	
Parallel Fan	Rotation	
0	Direct	

Calibration	
High Flow	Low Flow
500	0

VAV Box Overrides		
Primary Heat nciSatConfig8	Secondary Heat nciSatConfig7	Fan Override
NA	NA	Normal

Figure–3.8 Device Settings Dialog Box.

1. Highlight the device you want to edit.
2. Choose Device Settings from the Edit menu (Figure–3.4).
The device settings dialog box appears (Figure–3.8).
3. Edit values as necessary.
 - Setpoints:
 - Minimum Flow: Defines the minimum flow control point allowed by the controller.
 - Maximum Flow: Defines the maximum flow control point allowed by the controller.
 - Minimum Flow Heat: Defines the minimum flow control point allowed by the controller during reheat conditions.
 - Minimum Flow Stand: Defines the minimum flow control point allowed by the controller during standby conditions.
 - Parallel Fan: Defines the parallel fan setpoint value used by the controller to energize and de-energize the parallel fan.
 - Rotation: Defines the parameter used to reverse actuator rotation. Choices include direct or reverse action.
 - Calibration:
 - High Flow: Defines the terminal box flow at a velocity pressure of 1.0" w.g. (249 Pa). This parameter is required for controller operation.
 - Low Flow: Defines the terminal box flow at a velocity pressure of 0.1" w.g. (24.9 Pa). This parameter is usually set to zero (0). A value of not assigned 65535 (NA) or 0 prompts the controller to use two point calibration during operation.
 - VAV Box Overrides:
 - Primary Heat (nciSatConfig8): Allows manual control of primary form of terminal box heat. Choices include NA (normal mode), OFF (all stages off), and ON (all stages on).
 - Secondary Heat (nciSatConfig7): Allows manual control of secondary form of heat. Choices include NA (normal mode), OFF (all stages off), and ON (all stages on).
 - Fan Override: Overrides series and parallel fan operation. Choices include normal (normal fan operation), on (fan is overridden to on), or off (fan is overridden to off).
4. After editing device settings, click OK.

Calibration

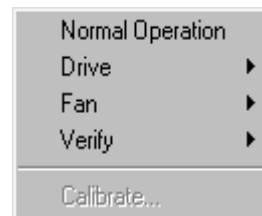
Note:

- The Maximum Flow Calibration and Minimum Flow Calibration must be performed in sequence. Other steps in these sections can be performed in any order. Skip sections that do not apply to the terminal box type being balanced.
- Devices must be calibrated individually.

To Check Rotation

Note: The purpose of this check is to verify that the damper actuator rotates in the correct direction.

1. Highlight device(s) you want to check.
2. Select Verify>Rotation Check from the Balance menu (Figure–3.9). The current status window displays “Starting Rotation.”



Figure–3.9 Balance Menu.

3. Follow prompts as directed by the software. The current status window indicates:
 - a. the rotation check failed by displaying “Rotation Fail.” At this point, manually check rotation by proceeding to step 4.
 - b. the rotation check passed by displaying “Rotation Pass.” Proceed to the next applicable section.
4. Verify that the controller is properly mounted.
5. Check the setscrews. Verify that they are properly tightened against the terminal box damper shaft.
6. Verify that the velocity pressure sensor tubing is properly connected.
7. Verify that travel adjustments are configured properly.
8. Push controller’s manual override button and manually rotate the damper. Clear any obstructions that prevent the damper actuator from mechanically rotating between the travel adjustments.
9. Repeat steps 1 through 3.

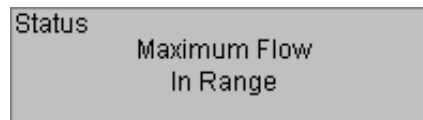
To Calibrate Maximum Flow

Note: The purpose of maximum flow calibration is to verify that the controller’s flow rate at its maximum flow setting is within acceptable job tolerances when compared to the actual discharge flow rate as measured with the flow hood. If the controller’s flow rate does not fall within the correct range, the software calibrates the controller.

1. Highlight the device you want to calibrate.
2. Select Verify>Maximum Flow>No Fan, Fan Off, or Fan On from the Balance menu.

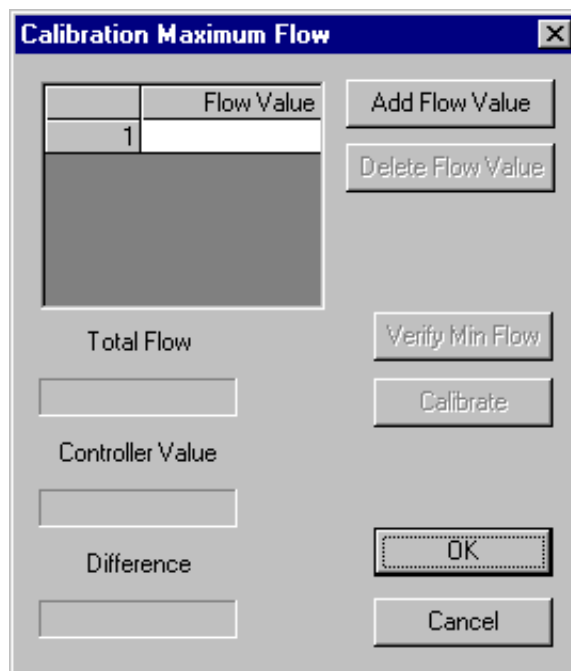
The current status window displays “Starting Maximum Flow Request.”

3. When the current status window displays “In Range” (Figure–3.10), highlight the device you want to calibrate and choose Calibrate from the Balance menu (Figure–3.9).



Figure–3.10 Maximum Flow In Range.

The Calibration Maximum Flow dialog box appears (Figure–3.11).



Figure–3.11 Calibration Maximum Flow Dialog Box.

4. Use a flowhood to measure and record the flow at each discharge.

5. Enter the first flow value in the upper left hand corner of the Calibrate Maximum Flow dialog box (Figure–3.11) by clicking in the empty cell beneath the Flow Value heading. To enter another flow value, click the Add Flow Value button and continue until you have entered all flow values.

The box automatically finds the total flow and the calculates the difference between the controller value and the total flow.

6. Choose one of the following:
 - a. If the difference is within job specifications and you wish to calibrate Minimum Flow, proceed to the next section.
 - b. If the difference is within job specifications and you do not wish to calibrate Minimum Flow, click OK and proceed to the next applicable section.
 - c. If the difference is not within job specifications, click the Calibrate button and return to Step 3.

To Calibrate Minimum Flow

Note:

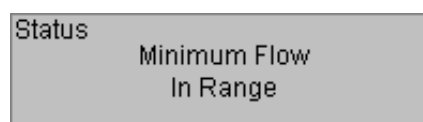
- The purpose of minimum flow calibration is to verify that the controller’s flow rate at its minimum flow setting is within acceptable job tolerances compared to the actual discharge flow rate as measured with a flow hood. If the controller’s flow rate does not fall within the correct range, the software calibrates the controller.
- Minimum flow calibration can only be performed immediately after maximum flow calibration.
- Minimum flow calibration should not be performed at a velocity pressure of less than 0.02” (5 Pa). If velocity pressure falls below 0.02” (5 Pa), increase the minimum flow setpoint value until the velocity pressure equals or exceeds 0.02” (5 Pa).
- The minimum flow may not need calibration unless precise minimum flow accuracy is an important job specification.

1. Click the Verify Min Flow button in the Calibrate Maximum Flow Dialog Box (Figure–3.11).

The current status window displays “Starting Minimum Flow Request.”

Note: If static pressure falls below 0.02” (5 Pa), the current status window displays “Error: Pressure too low.” Refer to Appendix A for corrective action.

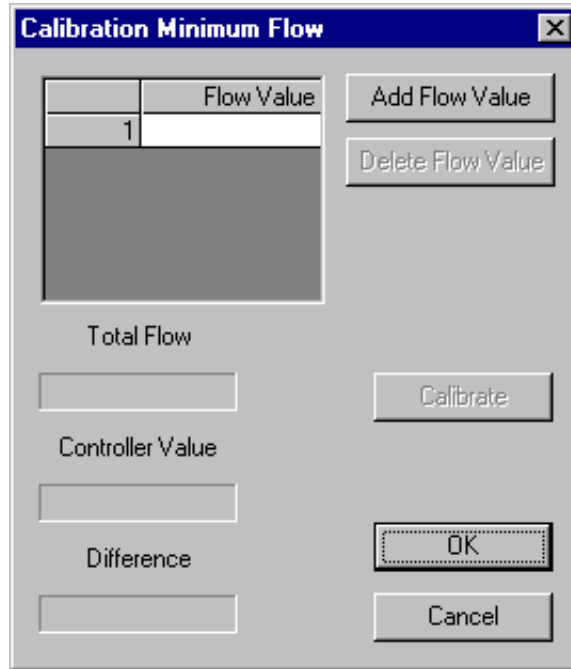
2. Wait until the current status window displays “In Range.”



Figure–3.12 Minimum Flow In Range.

3. Highlight the device you want to calibrate and choose Calibrate from the Balance menu (Figure–3.9).

The Calibration Minimum Flow dialog box appears (Figure–3.13).



Figure–3.13 Calibration Minimum Flow Dialog Box.

4. Use a flowhood to measure and record the flow at each discharge.
5. Enter the first flow value in the upper left hand corner of the Calibration Minimum Flow dialog box (Figure–3.13) by clicking in the empty cell beneath the Flow Value heading. To enter another flow value, click the Add Flow Value button and continue until you have entered all flow values.

The box automatically finds the total flow and the calculates the difference between the controller value and the total flow.

6. Choose one of the following:
 - a. If the difference is within job specifications, click OK and proceed to next applicable section.
 - b. If the difference is not within job specifications, repeat Maximum and Minimum Flow calibration procedures.

To Calibrate Reheat Minimum Flow

Note: This procedure ensures that a minimum amount of air is present during reheat operation.

1. Highlight the device you want to calibrate.
2. Select Verify>Reheat Minimum Flow from the Balance menu (Figure–3.9).
The current status window displays “Starting Reheat Minimum Flow Request.”
3. Wait until the status window displays “In Range.”
4. Highlight the device you want to calibrate and choose Calibrate from the Balance menu (Figure–3.9).
The Calibration Reheat Minimum Flow dialog box appears (Figure–3.14).

Flow Value
1

Total Flow

Controller Value

Difference

Figure–3.14 Calibration Reheat Minimum Flow Dialog Box.

5. Use a flowhood to measure and record the flow at each discharge.
6. Enter the first flow value in the upper left hand corner of the dialog box (Figure–3.14) by clicking in the empty cell beneath the Flow Value heading. To enter another flow value, click the Add Flow Value button and continue until you have entered all flow values.
The box automatically finds the total flow and the calculates the difference between the controller value and the total flow.
7. Choose one of the following:
 - a. If the difference is within job specifications, click OK and proceed to next applicable section.
8. If the difference is not within job specifications, click Calibrate and return to Step 3.

To Calibrate Standby Minimum Flow

Note: This procedure ensures that a minimum amount of air is distributed to the space when the controller is using the standby setpoint.

1. Highlight the device you want to calibrate.
2. Select Verify>Standby Minimum Flow from the Balance menu.
The current status window displays “Starting Standby Minimum Flow Request.”
3. Wait until the current status window displays “In Range.”
4. Highlight the device you want to calibrate and choose Calibrate from the Balance menu (Figure–3.9).
The Calibration Standby Minimum Flow dialog box appears (Figure–3.15).

Flow Value
1

Buttons: Add Flow Value, Delete Flow Value, Calibrate, OK, Cancel

Input fields: Total Flow, Controller Value, Difference

Figure–3.15 Calibration Standby Minimum Flow Dialog Box.

5. Use a flowhood to measure and record the flow at each discharge.
6. Enter the first flow value in the upper left hand corner of the dialog box (Figure–3.15) by clicking in the empty cell beneath the Flow Value heading. To enter another flow value, click the Add Flow Value button and continue until you have entered all flow values.
The box automatically finds the total flow and the calculates the difference between the controller value and the total flow.
7. Choose one of the following:
 - a. If the difference is within job specifications, click OK and proceed to next applicable section.
 - b. If the difference is not within job specifications, click Calibrate and return to Step 3.

To Calibrate Parallel Fan Setpoint

Note: This procedure ensures that a minimum amount of air is available during parallel fan operation.

1. Highlight the device you want to calibrate.
2. Select Verify>Parallel Fan Setpoint from the Balance menu (Figure–3.9).
The current status window displays “Starting Parallel Fan Setpoint Request.”
3. Wait until the current status window displays “In Range.”
4. Highlight the device you want to calibrate and choose Calibrate from the Balance menu (Figure–3.9).
The Calibration Parallel Fan Setpoint dialog box appears (Figure–3.16).

Flow Value
1

Buttons: Add Flow Value, Delete Flow Value, Calibrate, OK, Cancel

Input fields: Total Flow, Controller Value, Difference

Figure–3.16 Calibration Parallel Fan Setpoint Dialog Box.

5. Use a flowhood to measure and record the flow at each discharge.
6. Enter the first flow value in the upper left hand corner of the dialog box (Figure–3.16) by clicking in the empty cell beneath the Flow Value heading. To enter another flow value, click the Add Flow Value button and continue until you have entered all flow values.
The box automatically finds the total flow and the calculates the difference between the controller value and the total flow.
7. Choose one of the following:
 - a. If the difference is within job specifications, click OK and proceed to next applicable section.
 - b. If the difference is not within job specifications, click Calibrate and return to Step 3.

To Adjust Fan Manually

Note: This procedure closes the terminal box damper and lets you manually set the terminal box fan flow.

1. Highlight the device you want to adjust.
2. Select Verify>Manual Fan Adjust from the Balance menu (Figure–3.9).
The current status area of the main information panel displays “Starting Manual Fan Adjust.”
3. Wait until the current status area of the main information panel displays “Manually Adjust Fan” and make adjustments as required by the job drawings.
4. Using a flow hood, measure and record the flow at each discharge.
5. Find the total measured flow.
6. Compare the total measured flow to the flow value specified by the job drawings.
 - a. If the total measured flow is within the job specified tolerance value, proceed to next applicable section.
 - b. If the total measured flow is outside of job specified tolerance, repeat steps 1 through 6.

Individual Commands

The TAC MicroNet VAV Flow Balance software is designed to let you manipulate VAV functions individually. The instructions below explain how to check fan and actuator operation independently of other air balancing or calibration procedures. At any time, you can restore the device(s) to normal operation by following the instructions below.

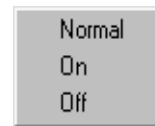
To Restore to Normal Operation

Note: The controller will not be completely restored to normal operation until the document is closed.

1. Highlight device(s) you want to restore to normal operation.
2. Select Normal Operation from the Balance menu (Figure–3.9) or click the appropriate icon on the balance tool bar (Figure-2.4).
The current status window displays “Normal.”

To Override Fan

1. Highlight device(s).
2. From the Balance menu (Figure–3.9), select Fan>Normal, On, or Off (Figure–3.17).



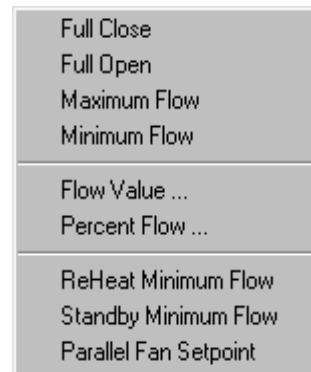
Figure–3.17 Fan Menu.

- If you select On, the fan is overridden to on. A solid red fan icon appears in the current status area of the main information panel.
- If you select Off, the fan is overridden to off. A hollow red fan icon appears in the current status area of the main information panel.
- If you select Normal, the fan operates normally. A solid green fan icon appears in the current status area of the main information panel if the fan is on. If the fan is off, a hollow green fan icon appears.

To Drive Actuator to a Specified Position

Note: The values mentioned below can be found on the “Application Summary” page in the application used by this controller under “VAV Box Configuration Values” and “Parallel Fan Control.” The default application values will be used unless they are changed.

1. Highlight device(s) you want to drive.
2. Select Drive (Figure–3.18) from the Balance menu (Figure–3.9).
Choices include:
 - Full Close: Drives the actuator to the fully closed position
 - Full Open: Drives the actuator to the fully open position.
 - Maximum Flow: Drives the actuator to the maximum flow setpoint. Default is 500cfm (236L/s).
 - Minimum Flow: Drives the actuator to the minimum flow setpoint. Default is 150cfm (71L/s).
 - Flow Value: Drives the actuator to the value you specify.
 - Percent Flow: Drives the actuator to a percentage of the range between the minimum and maximum flow values.
 - ReHeat Minimum Flow: Drives the actuator to the reheat minimum flow setpoint. Default is 200cfm (94L/s).
 - Standby Minimum Flow: Drives the actuator to the standby minimum flow setpoint. Default is 100cfm (47L/s).
 - Parallel Fan Setpoint: Drives the actuator to the parallel fan setpoint. Default is 350cfm (165L/s).



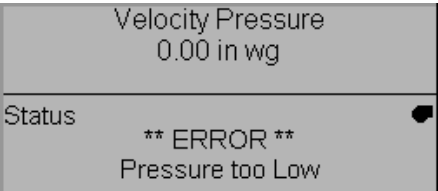


Figure–3.18 Drive Submenu.

Appendix A

Troubleshooting

This appendix contains troubleshooting information including a description of the problem, cause, and corrective action.

Problem	Cause and Implication	Corrective Action
<p>The Flow Balance software is frozen.</p> <p>The PC loses power when a document is open and devices are connected.</p> <p>The PC is turned off when a document is open and devices are connected.</p>	<p>Connected controllers may operate erratically unless corrective action is taken.</p>	<p>Wait fifteen minutes for the controller(s) to reset automatically or manually reset power to all connected units. To reset power, remove and then reapply power to the controller. Do not allow document to be saved until you have reset power to the controllers. If the document is saved, it may be lost.</p>
<p>A red icon appears in the current status window.</p> 	<p>The Flow Balance software has been overridden by an emergency command on the LON.</p>	<p>Use a third party network management tool to change the value associated with nviEmergCmd to a normal control state. Consult third party documentation for more information.</p>
<p>The current status window indicates a communication error.</p> 	<p>Communication between the PC and the controller or sensor has been interrupted.</p>	<p>Check the connection between the PC and the controller or the PC and the sensor. Reestablish the connection.</p>
<p>The Flow Balance software behaves erratically.</p>	<p>A BIOS energy management feature may be enabled on the PC.</p>	<p>Disable the BIOS energy management feature. Consult PC documentation for more information.</p>
<p>The current status window indicates a low pressure error during minimum flow calibration.</p> 	<p>Velocity pressure in the AHU has fallen below 0.02" (5 Pa).</p>	<p>Increase pressure to a minimum of 2.00" (498 Pa).</p>

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