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DFM44E Series

Installation Instructions

DFME

System Requirements:
Win 95b/98/Me/2000/XP
Resolution: 1024 x 768
32MB RAM

23555 Telegraph Rd.
Southfield, MI 48034

248.356.1400

MAXITROL® company

DFME Amplifier MUST be powered from it's own separate 24 VAC 40 VA transformer.

Proper DFME operation can only be achieved by completing a full setup routine before operation.

Before installing Temperature Controller and Software, read the entire installation instruction manual to ensure proper and successful operation.

DFME Product Description

Temperature Controller for use with Recirculating Direct Gas-Fired Modulating Air Heaters in accordance with applicable specifications of ANSI Z83.18.

DFM44E System Requirements

- ADFM44E Amplifier (Ambient Operating Temperatures: -40°F (-40°C) to 158°F (70°C))
- TDFM44 Selector (40°F - 95°F)
- TS394-2B-4 Return Air Sensor
- TS394-2B-4 Outdoor Air Sensor
- TS194Q Discharge Air Sensor
- MT Series Mixing Tube
- M/MR212 Series Modulating Gas Valve
- Software CD-ROM
- Signal from Airflow Measuring Device or Outside Air Damper (not supplied)
- Laptop or PC with Windows 95b/98/Me/2000/XP (32 MB RAM minimum) (not supplied)
- Patch Cable w/ RJ45 connectors (both ends) (not supplied)
- Serial Cable (DB9M to DB9F) (not supplied)
- Separate 24 VAC 40 VA Power Supply (not supplied)

Accessories

- Airflow Measuring Device (available)

  Note: Auto-Calibrate feature requires Airflow Measuring Device with 0-10 VDC output.

Features

- Low Fire Start Timer (standard on all versions)
- Unoccupied Mode (standard on all versions)
  - 1-24 VDC N.O. Relay (1 W max) required (not supplied)
- Mild Weather Thermostat (version 2.2)
  - 1-24 VDC N.O. Relay (1 W max) required (not supplied)
- Freeze Thermostat (version 2.3)
  - 1-24 VDC N.O. Relay (1 W max) required (not supplied)
- Mild Weather and Freeze Thermostat (version 2.4)
  - 2-24 VDC N.O. Relays (1 W max) required (not supplied)
- TSDFM44 Remote Room Sensor (optional on all versions)

Step1: Hardware Installation Instructions

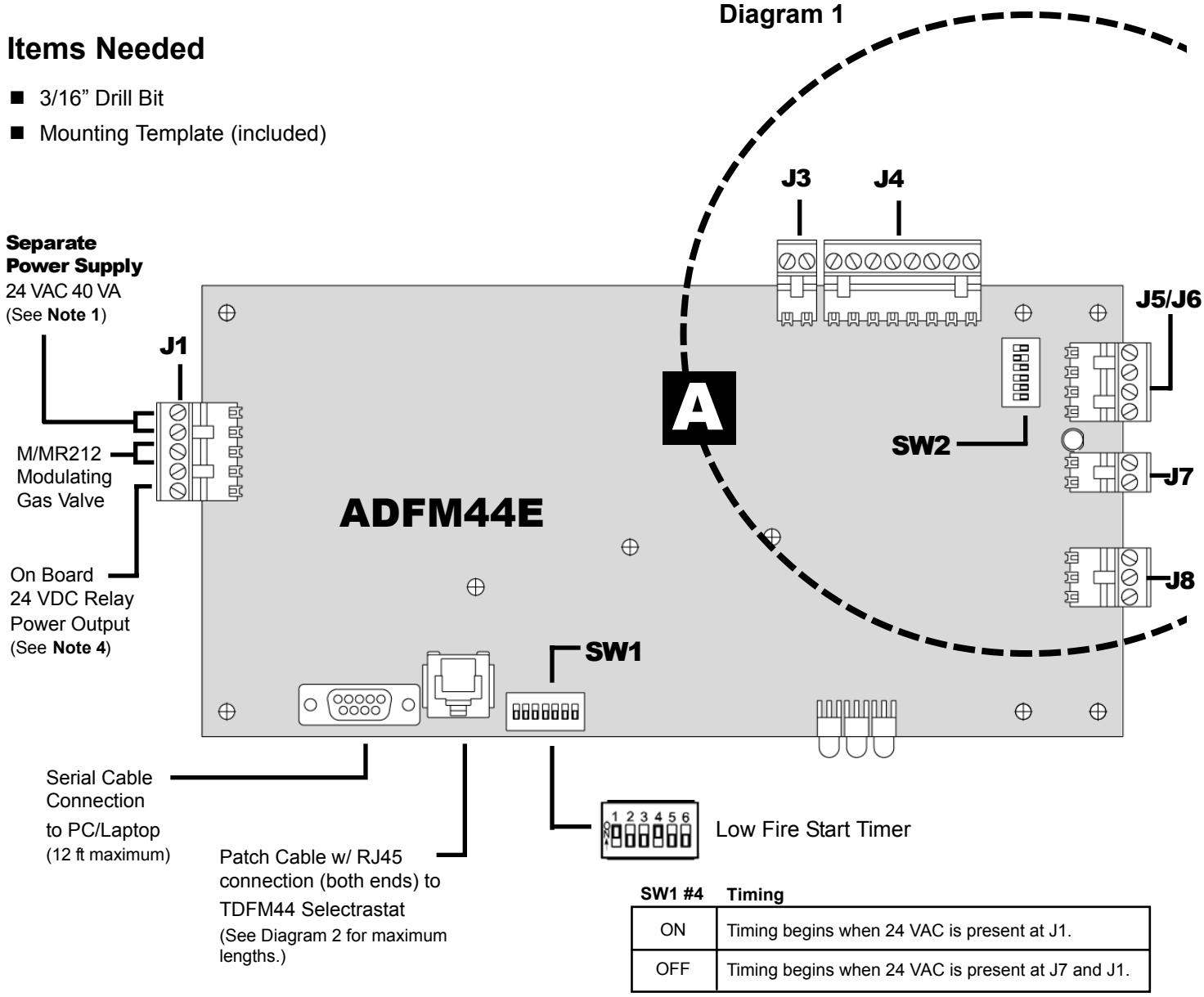
After each component has been located and mounted, set dipswitches and make wire connections according to **Diagrams 1 and 2.**

Items Needed

- 3/16" Drill Bit
- Mounting Template (included)

ADFM44E Connections

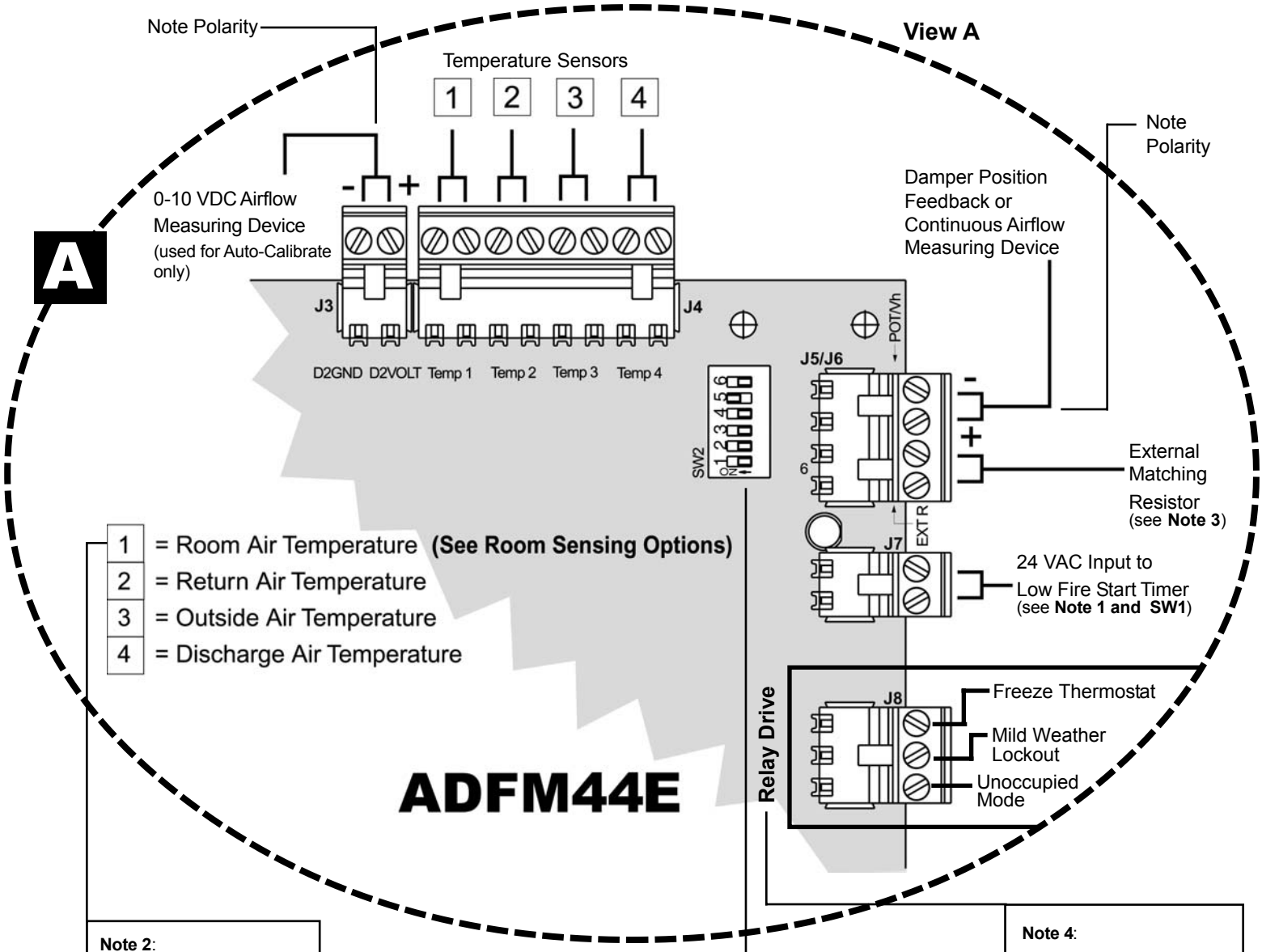
Diagram 1



SW1 #4	Timing
ON	Timing begins when 24 VAC is present at J1.
OFF	Timing begins when 24 VAC is present at J7 and J1.

Note 1:

- Maxitrol ADFM44E amplifiers have full wave rectifiers (diodes). DO NOT connect any other external devices requiring 24 VAC to the same transformer powering the ADFM44E amplifier (J1) doing so will destroy the ADFM44E amplifier and void the warranty.
- 24 VAC supply power (J1) with customer supplied relay (1 W max) may be used as input (J7) to begin Low Fire Start Timer.



Note 2:
This connection is for direct attachment of TSDFM44 to ADFM44E board only. See diagram 2, C.

Switch **SW2** is set as in chart for the **Damper** or **Continuous Airflow Measuring Device** feedback being used.

Note 4:
Max. Coil Power = 1 W. The corresponding relay drive (J8) is at ground (24 VDC) when Mild Weather Lockout, Freeze Thermostat or Unoccupied Mode are inactive.

Feedback	SW2
0 to 5V	#5, #6 ON
0 to 10V	#5 ON
4 to 20 mA	#4, #5 ON
135 ohm POT	#1 ON
500 ohm POT	#2 ON
10 K ohm POT	#3 ON
POT with EXT R	ALL OFF

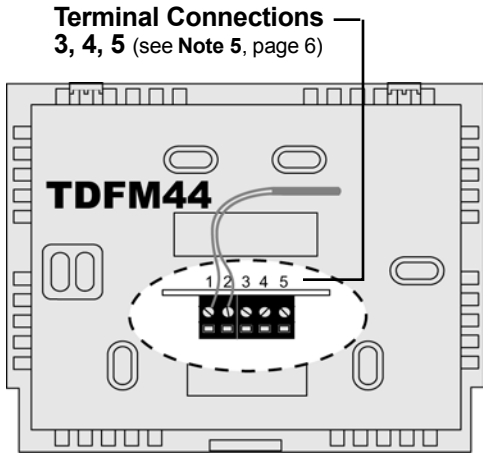
When properly connected, the resistance or voltage measured across the feedback connection (J5) should increase as the outside air damper opens. Similarly, the resistance or voltage should decrease as the outside air damper closes.

Note 3:
If a damper feedback POT not having a value of 135, 500 or 10 K is used, an External Resistor equal to the POT value must be connected to the AMPLIFIER (J6). Diagram 1, View A. **ALL of SW2 should be OFF.**

Diagram 2

Integral to TDFM44 Selectrastat

A. Temperature sensed by TDFM44 sensor:
Leave terminals #1 and #2 connected to sensing element.
Place SW1 #1 ON.



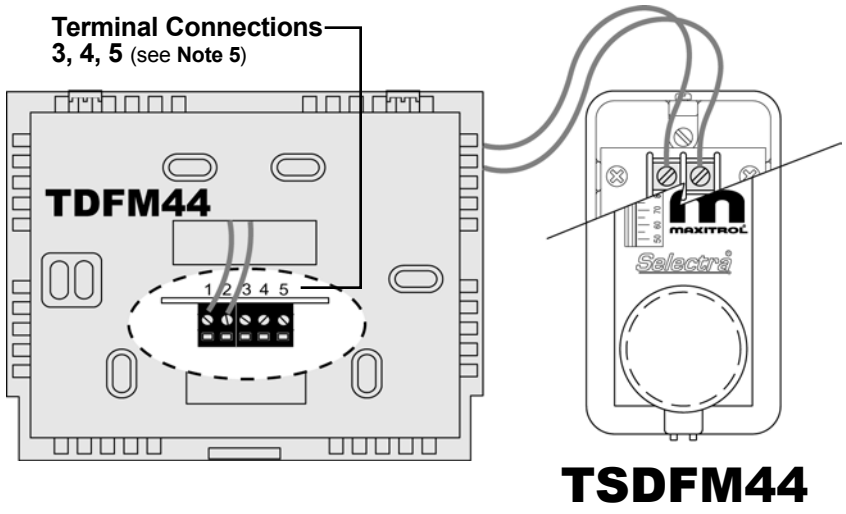
(TDFM44 to ADFM44E connection: 120 ft maximum)

Diagram 2

Remote to TDFM44 Selectrastat (DFM44ER Series)

B. Temperature remotely sensed by TSDFM44 and connected to TDFM44:

Disconnect or remove installed TDFM44 sensing element and replace with TSDFM44 wires. Place SW1 #1 ON.



(TDFM44 to TSDFM44 connection: 100 ft maximum (18 AWG))
(TDFM44 to ADFM44E connection: 100 ft maximum)

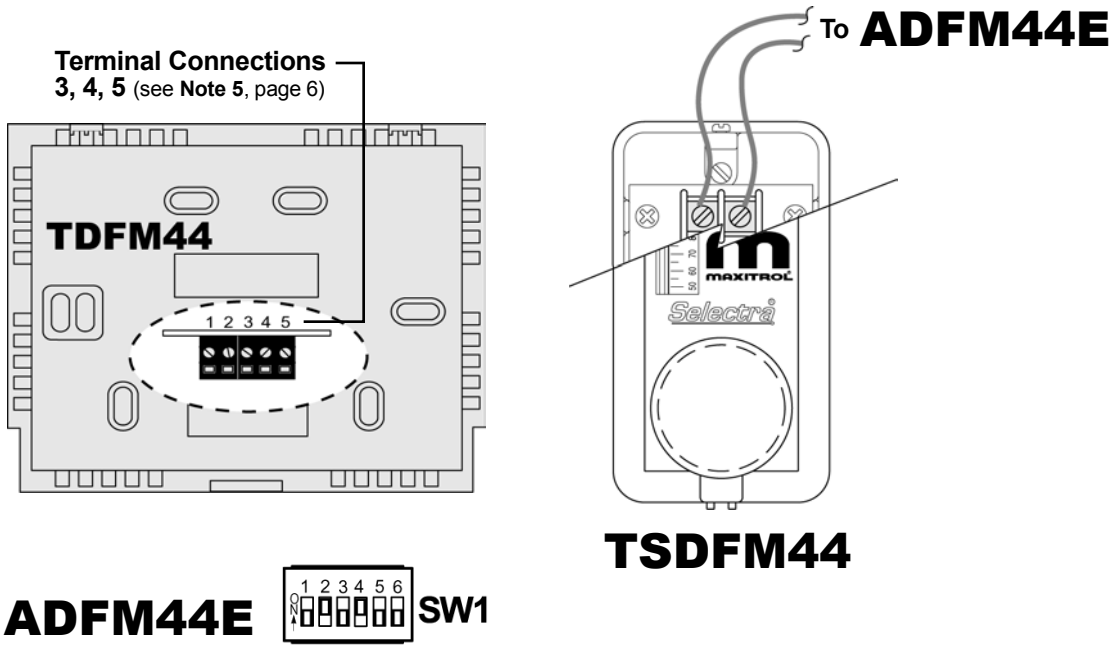
Note 5:
Terminal connections for TDFM44 SPDT ON-OFF-ON Switch 1A/24 V Max
- **3**: Switch #1
- **4**: Common
- **5**: Switch #2

Diagram 2

Remote to TDFM44 Selectrastat (DFM44ER Series)

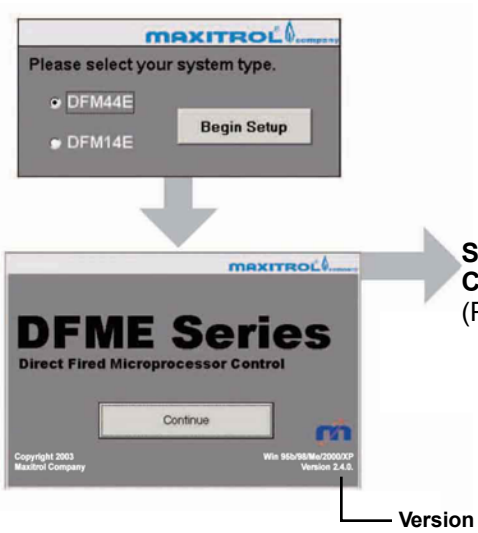
C. Temperature remotely sensed by TSDFM44 and connected directly to ADFM44E board:

Disconnect or remove installed sensing element from TDFM44. Place SW1 #2 ON.



(ADFM44E to TSDFM44 connection: 500 ft maximum (18 AWG))
(TDFM44 to ADFM44E connection: 160 ft maximum)

Step 2: Installing Software



Setup Console (Page 9)

2.1 Insert DFME CD into CD-ROM drive. Note: CD will AUTO RUN.

2.2 Select the Console Programs to be installed.

2.3 After successful installation(s), select **Exit**.

If a "Version Conflict" message box appears during setup, select "NO TO ALL."

Step 3: Setup Console

3.1 Power ADFM44E Controller Board.

3.2 Select PC **Start**... **Programs**... **Maxitrol DFME**... **Maxitrol DFME Setup Console** to open program.

3.3 Select **ADFM44E**... **Begin Setup**... **Continue** and...

> **IMPORTANT**: Wait for the data upload to be completed. "Data Upload Complete" will be indicated in the status bar along the bottom of the Setup Console window.
> If the status bar does not read "Data Upload Complete," select Upload/Reset and wait for upload to complete. (It may take several seconds for upload to begin.)

3.4a Select and change parameters (ie. Temp Mode, Gas Type, Unoccupied Mode, Mild Weather Lockout, etc...) as needed.
or
3.4b Select **Load Data from File**. Go to Step 4.

3.5 Select **Damper Setup**. Choose control type **A**, **B**, **C**, **D** or **E** and follow instructions.

3.6 Select **Setup Console**.

3.7 Select **Save Data to File** (if desired).

3.8 Select **Update Amplifier**. Amplifier MUST be updated for changes to take effect.
Wait for status bar to indicate "Data Download Complete."

3.9 Select one of the following:

i. **Control Mode** to begin the amplifier control sequence,
ii. **Control Console** to monitor system (closes "Setup Console" and opens Step 5: Control Console, 5.3),
iii. **Exit** to exit program and automatically begin the amplifier control sequence.

3.10 **IMPORTANT**: Disconnect the serial cable when prompted.

3.11 Go to **Step 5: Control Console**.

Step 4: Load Data from File

4.1 Select **Load Data from File**.

4.2 Select **Open Program**. Status bar indicates "File Load Complete."

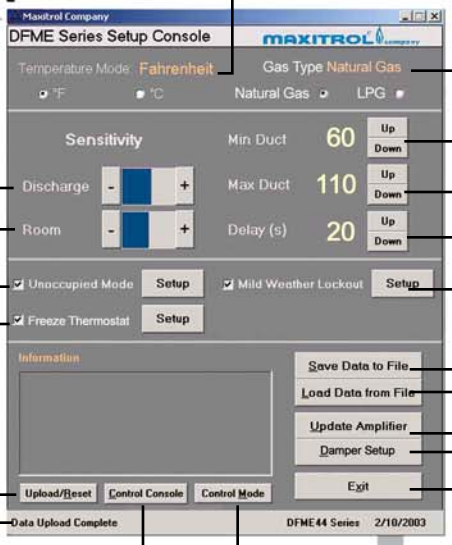
4.3 Select **Update Amplifier**.

4.4 Return to Step 3.9.

Setup Console

from Page 8

F



Select between **Fahrenheit & Celcius** mode.

Select between **Natural Gas** and **LPG Gas**.

Adjust **Discharge Air Sensitivity**.
+ = Increases Sensitivity.
- = Decreases Sensitivity.

Adjust **Room Sensitivity**.
+ = Increases Sensitivity.
- = Decreases Sensitivity.

Set **Min Duct** discharge temp (min 40°F).

Set **Max Duct** discharge temp (max 140°F).

Set **Low Fire Start Timer Delay** (max 30 seconds).

Unoccupied Mode Setup.
Check box to enable Setup.

Mild Weather Lockout Setup.
Check box to enable Setup.

Freeze Thermostat Setup.
Check box to enable Setup.

Save Setup **Data to File**.

Load Setup **Data from File**.

If automatic upload of data does not occur successfully, select **Upload/Reset**.

Update Amplifier.
MUST be selected once changes have been made in order to update the amplifier.

Opens **Damper Setup** menu.

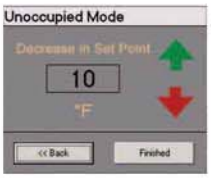
Status Bar.
Indicates status of data upload.

Opens **Control Console**.

Control Mode.
Begins the amplifier control sequence.

Exit the program. At message prompt unplug the serial cable.

Unoccupied Mode

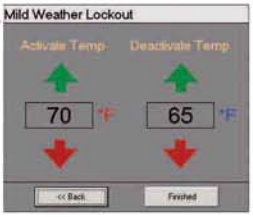


1 Set **Decrease in Set Point temperature** (min 2°F and max 50°F).

2 Set **Finished.**

Note 6:
The **Unoccupied Mode** will remove 24 VDC (1 W max) to the relay (J1, J8 terminal) when a decrease in room Set Point is greater than the selected "Decrease in Set Point." Relay power is restored when the TDFM44 Set Point is increased or the lower Set Point is reached.

Mild Weather Lockout



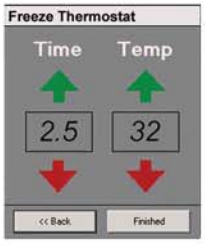
1 Set **Activate Temperature** (min 40°F and max 90°F).

2 Set **Deactivate Temperature** (min 3°F less than Activate).

3 Select **Finished**.

Note 9:
The **Mild Weather Lockout** will remove 24 VDC (1 W max) to the relay (J1, J8 terminal) when the outside air temperature reaches the Activate temperature. Relay power is restored when the Deactivate temperature is reached. A minimum of 3°F between the Activate and Deactivate temperatures is required. **ONLY AVAILABLE with DFM44 versions 2.3, 2.4** and **E2.3, E2.4**.

Freeze Thermostat



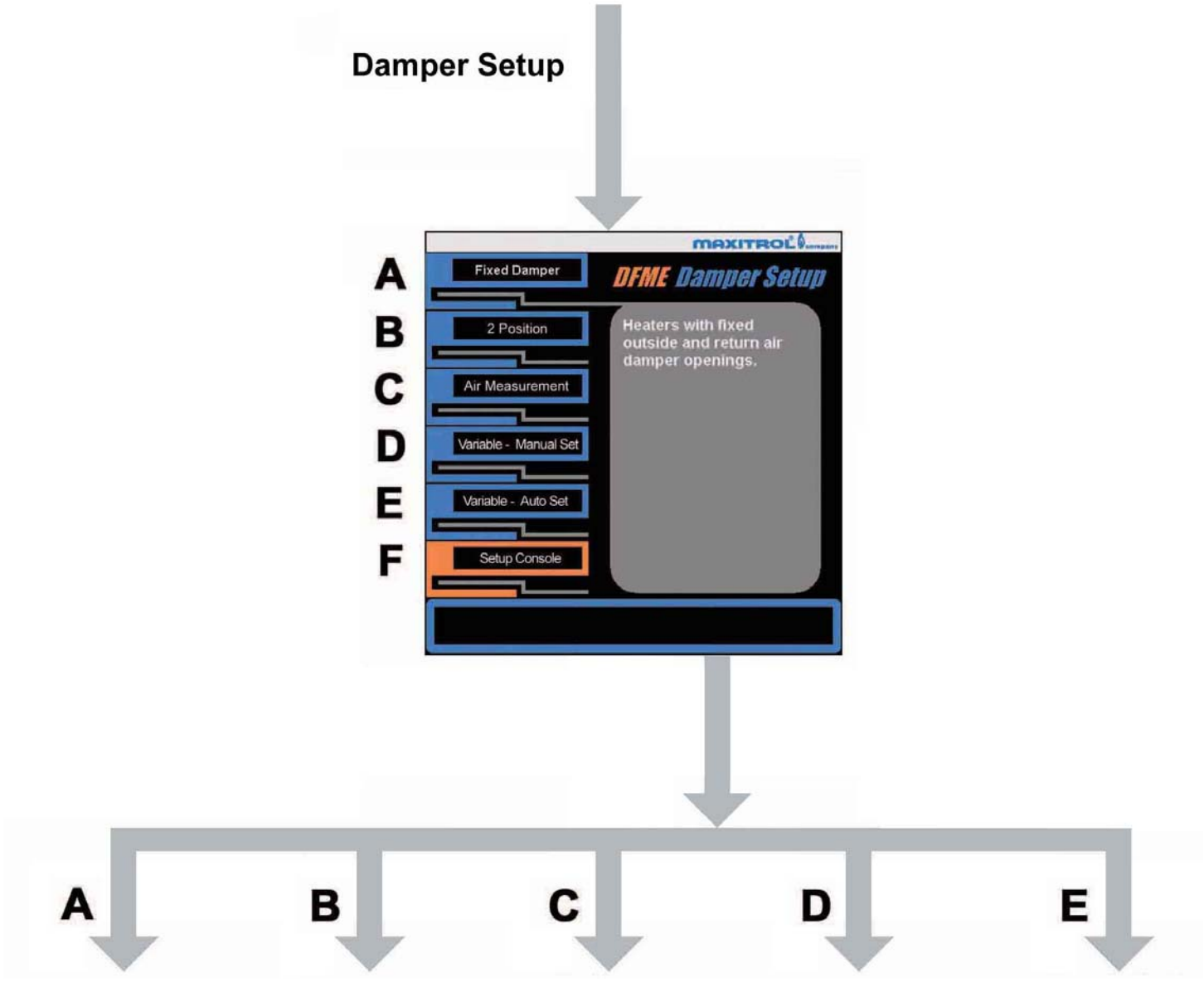
1 Set **Time** (0.5 to 5 min).

2 Set Activate **Temperature** (30°F to 60°F).

3 Select **Finished**.

Note 7:
The **Freeze Thermostat** will remove 24 VDC (1 W max) to the relay (J1, J8 terminal) when the discharge air temperature does not exceed the Freeze Thermostat Set Temperature when measured after the set time. **ONLY AVAILABLE with DFM44 versions 2.3, 2.4** and **E2.3, E2.4.**

Damper Setup



Fixed Damper
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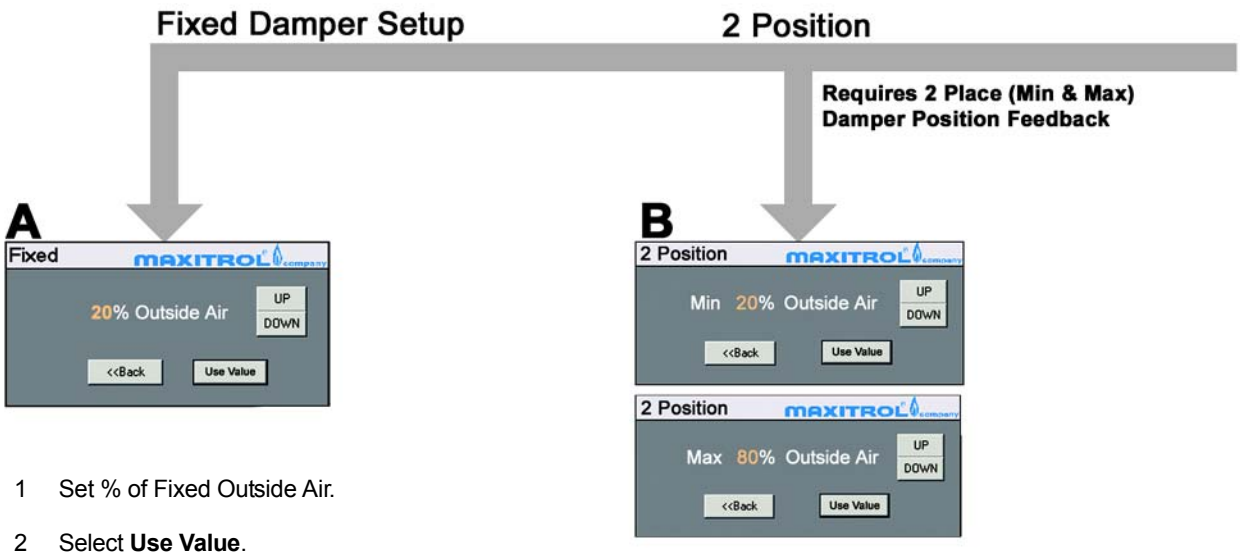
2 Position
(Page 11)

Continuous Airflow Measurement
(Page 12)

Variable Damper Setup
(Page 13)

Auto-Calibrate Damper Setup
(Page 14)



1 Set % of Fixed Outside Air.

2 Select **Use Value**.

3 Select **Back**.

4 Return to Step (3.6), page 8.

1 Set outside air damper to obtain Minimum % Outside Air.

2 Set **Minimum % Outside Air**.

3 Select **Use Value**.

4 Set outside air damper to obtain Maximum % of Outside Air.

5 Set **Maximum % Outside Air**.

6 Select **Use Value**.

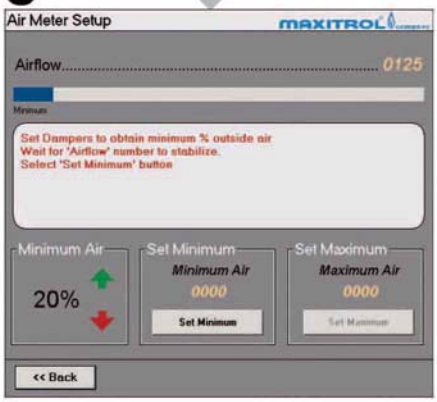
7 Select **Back**.

8 Return to Step (3.6), page 8.

Continuous Airflow Measurement

Requires Continuous Linear Airflow Measuring Device (See Note 9)

C



1 Set **Minimum Air** (outside).

2 Set outside air damper to obtain Minimum % Outside Air.

3 Wait for **Airflow #** to stabilize (see **Note 10**).

4 Select **Set Minimum**.

5 Set outside air damper to obtain 100% outside air.

6 Wait for **Airflow #** to stabilize.

7 Select **Set Maximum**.

8 Select **Back**.

9 Return to Step (3.6), page 8.

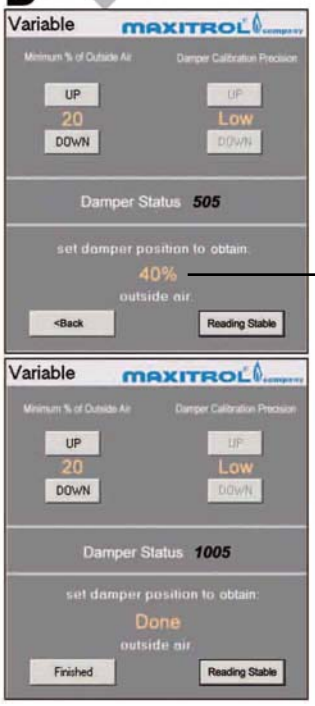
Note 9: Select an airflow measuring device range (see device manual) that achieves an output "Display" differential of no less than 700 and with a maximum display of no more than 1022 at Maximum Outdoor Airflow. An airflow display of 1022 or greater prior to reaching Maximum Outdoor Airflow indicates that a larger range must be used. An airflow display differential (max flow # minus min flow #) of less than 700 at Maximum Outdoor Airflow indicates that a smaller airflow setting range is desired.

Note 10: Numbers displayed for "Damper Travel" and "Airflow" are used to indicate when the process is stable. The numbers are also used as an indication of minimum (0) to maximum (1024) damper travel or flow. The numbers are arbitrary and are not the actual percentages of flow or damper movement.

Variable Damper Setup

Requires Continuous Damper Position Feedback and Separate External Airflow Measuring Device which is NOT connected to ADFM44E.

D



Damper Status #
(See **Note 10**).

Program Records Damper Position Point at Specified % of Outside Air.

1 Select **Low** (up to 6 points), **Medium** (up to 11 points) or **High** (up to 21 points) to obtain the necessary level of Calibration Precision.

2 Set **Minimum % Outside Air**.

3 Set outside air damper to obtain **Minimum % Outside Air**.

4 Wait for **Damper Status #** to stabilize then select **Reading Stable** (see **Note 10**).

5 Look to screen to determine next % outside air setting.

6 Set outside air damper to obtain prompted % of outside air.

7 Continue with steps 4, 5 and 6 until "Done" appears.

8 Select **Finished**.

9 Return to Step (3.6), page 8.

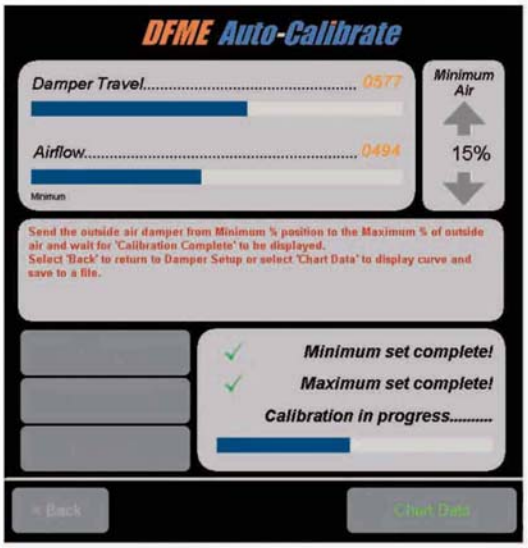
E

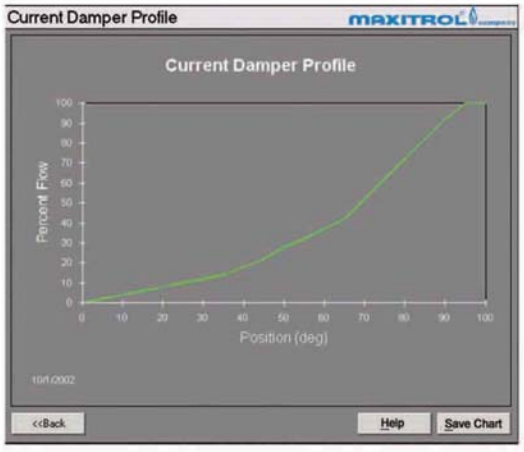
Requires Continuous Damper Position Feedback and an Airflow Measuring Device 0-10 VDC (max) which is connected to ADFM44E.

Note: Airflow Measuring Device is for setup only. See Note 9, page 12.

Auto-Calibrate Damper Setup

Auto-Calibrate Setup Screen





Program Records Damper Position and the % of Outside Air Automatically.

1 Set **Minimum Air** (outside).

2 Set outside air damper to obtain minimum % of outside air and wait for **Airflow #** and **Damper Travel #** to stabilize (see **Note 10**, page 12).

3 Select **Set Minimum**.

4 Set outside air damper to obtain 100% of outside air and wait for **Airflow #** and **Damper Travel #** to stabilize.

5 Select **Set Maximum**.

6 Return outside air damper to step 2 position and wait for **Airflow #** and **Damper Travel #** to stabilize.

7 Select **Calibrate**.

8 Set outside air damper from step 2 Minimum % position to 100% outside air and wait for “Calibration Complete” to be displayed.

9a Select **Back** to return to Damper Setup.

or

9b Select **Chart Data** to display curve and save to a file. Note: Select Help for instructions on how to save chart data to an Excel file.

10 Return to Step (3.6), page 8.

Step 5: Control Console

The Control Console is a monitor utility where changes to the Unoccupied Mode, Mild Weather Lockout, Freeze Thermostat, Minimum and Maximum Duct Temperatures and Sensitivity can be made.

5.1 Connect ADFM44E to the computer with serial cable.

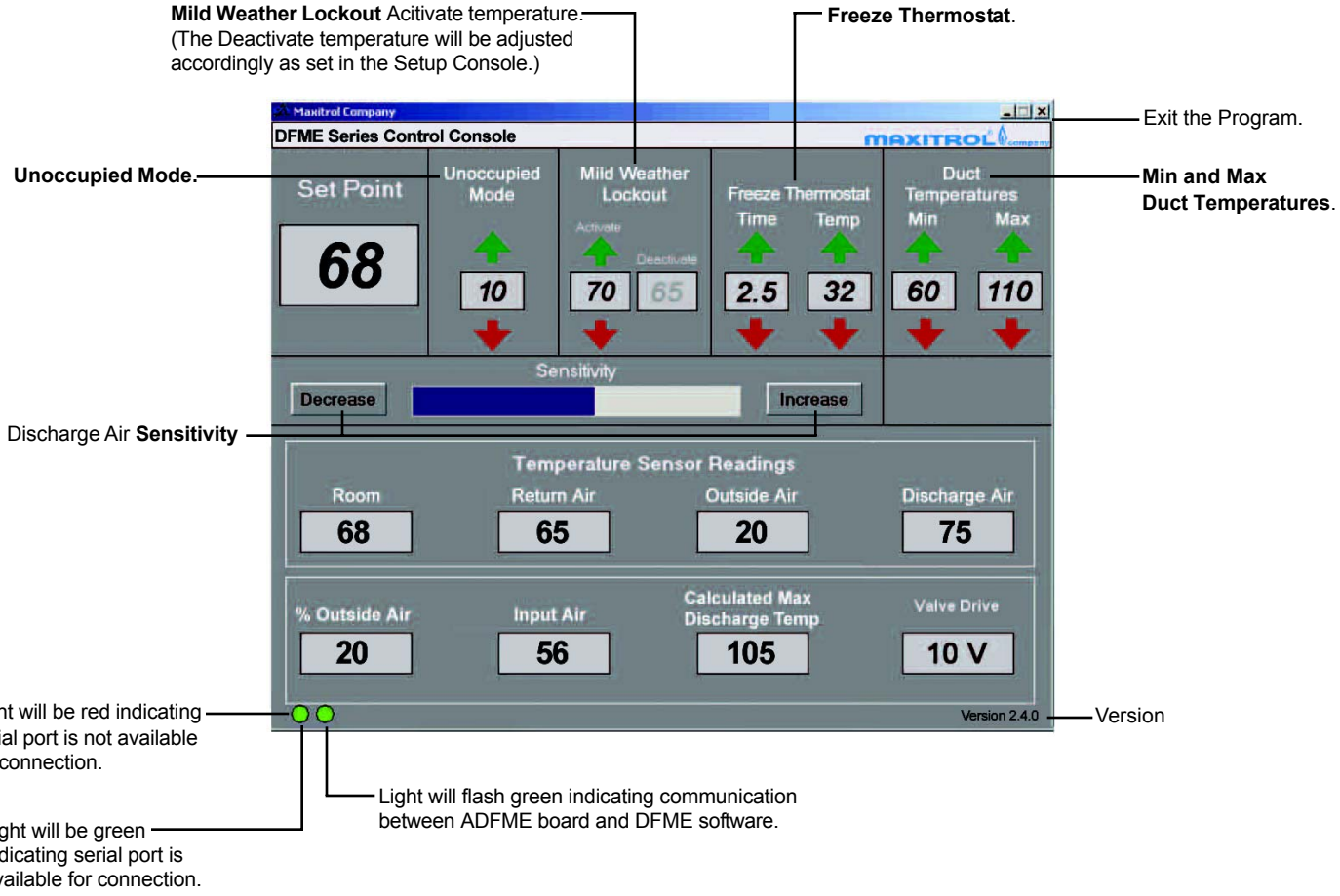
5.2 Select PC **Start**... **Programs**... **Maxitrol DFME**... **Maxitrol DFME Setup Console** to open program.

5.3 Select **ADFM44E**... **Begin Control**...

5.4 If "DFME Mode Text Box" appears, select **Control Mode**. (It may take several seconds for monitoring to begin.)

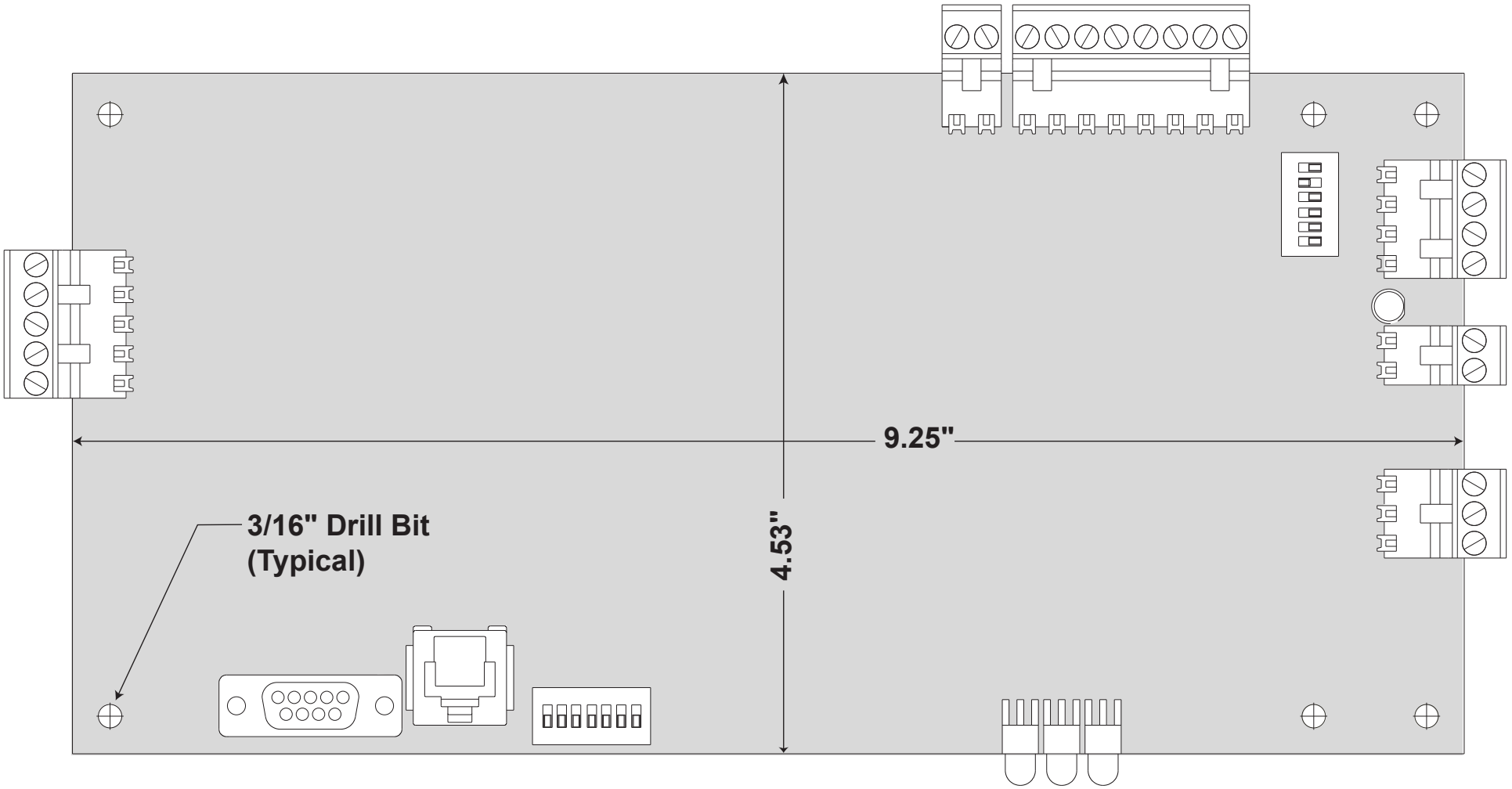
5.5 Select and change **Unoccupied Mode, Mild Weather Lockout, Freeze Thermostat, Minimum and Maximum Duct Temperatures and Sensitivity** as needed.

5.6 **IMPORTANT**: Disconnect the serial cable connecting the computer to the ADFME board before exiting the Control Console.



Mounting Template for drilling holes in ADFME circuit board.

Actual Size.



Please Note:

When printing, Do NOT Scale.
Print actual size.