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# SERVICE INSTRUCTION

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## AIRTRONICS FIELD CALIBRATION PROCEDURE

### 1. System Requirements

#### Pneumatic System

The pneumatic system must be able to supply and regulate 1600 slpm (57 scfm) at 100 psi for a minimum of two minutes. The compressed air must be filtered to .01 microns. The air supply needs to be dried and have a dew point of -20 degrees Fahrenheit.

#### Software Versions

Display Module – Version 2.71  
Flow Board – Version 0.7 (PIC Chip)  
Remote Board – Version 2.54

#### Electrical Connections

Electrically connect all devices per the Airtronic Manual. Connect a computer from the “serial port” to the serial port on the flow board (three pin). The computer must have “Hyper Terminal” software loaded.

Cable Connections:

PIC side (4-pin header)	PC side (DE9-S)
Pin2 -----	Pin2
Pin3 -----	Pin3
Pin4 ----- GND -----	Pin5

Note: On the PIC side, pin 1 is marked on the PCB.

Connect a RS-232 compatible terminal to the three-pin header on the sensor PCB. Set the terminal to 19200 baud, 8 bits, 1 stop bit, and no parity. Set flow control to “none”. The jumpers on the sensor board do not need to be changed to calibrate the unit. The calibration process is controlled via the RS-232 link.

#### Pneumatic Supply Connections

Connect a minimum 3 ft. long x 12 mm or 1/2" I.D. tube to the inlet supply of the Airtronic. There must be a shut off valve on the inlet.

#### Pneumatic Output Connections

Connect a 2 1/2 ft. long or less x 12 mm or 1/2" I.D. tube to the outlet of each channel. The Master Standard input tube must be 12 mm or 1/2" I.D. x 1 ft. or less. The Master Standard output tube size must be at 12 mm or 1/2" I.D. x 2 ft. long. The end of this tube must be open to atmosphere and unobstructed.

**2. Calibration Procedure and Initial Settings**

Fill in and record all necessary data on Table #1 - Airtronics Test Data Sheet.

Verify SW 1 dipswitches on the Remote Board are set for the proper unit being calibrated, see the table below. Set the SW 2 dip switches on the Airtronics Display Module to the off position. Air supply should be turned off.

For 300 slpm Model	
SW1-1	On
SW1-2	Off
SW1-3	On
SW1-4	Off

For 750 slpm Model	
SW1-1	Off
SW1-2	On
SW1-3	Off
SW1-4	On

**3. Turn on power to AirTronic**

Turn on power to the remote air panel and display card by turning on "main power" on the test cabinet. Power and communication are indicated by the following conditions.

- The Green led will light up on the remote board. If the green led does not illuminate and the red led does then there is a communication problem. Check wire terminations.
- The LED display will light up on the display card.
- The stepper motors will find the zero starting position (closed). If the stepper motors do not "zero", check the wire connections and check needle for free movement.
- There are two red LED's on the flow board. The one closest to the "PIC" will stay continuously illumination. The one farthest from the "PIC" will illuminate then turn off — then back on, at continuous frequency. Both must be properly indicating.

**4. Needle Stop Test**

Turn off the power. Turn on the air supply valve and adjust to 85 +/- 2 psi. DO NOT EXCEED 100 PSI. Manually move each needle CCW (open) then CW – the needles must move easily from closed position. The needle stop must hit the valve stop. If they are not hitting, readjust the needle collar such that they are in contact.

**5. Air Valve Test**

Manually rotate one of the needle valves CCW (open). There must be no audible air leak from that channel. Rotate both channels fully CW (closed). There must be no audible air leaking from either valve output or from the needle end of the valve. If there is an air leak, adjust the needle collar as in Step 4.

**6. Input Pressure Calibration**

Make sure the flow board "PIC" chip is version 0.7. Turn on the power. Press "SELECT" twice on the Airtronic Display Module to read STATUS. If necessary, calibrate the remote board potentiometer to match the pressure gauge reading (85.0 psi). The accuracy of the unit is based on the accuracy of this value. Seal potentiometer with inspector's lacquer.

Connect the Master flow meter to the channel being calibrated with 1/2" output tubing.

**7. Initialize Calibration Software**

Connect the serial cable from the flow board on the Airtronics unit to the USB to serial port adapter (observe polarity on cable).

Start the "Hyper Terminal software" on the computer. Click transfer, capture text, and save under SN. Press <Enter> key to start capturing the text.

**7.1 Calibration**

Press <Enter> again to bring up the menu with six numbered choices. Select "6" <Enter> and set the filter constant to "40" <Enter>. Press <Enter> to bring up the menu. Select either number one or two depending upon which channel is being calibrated.

**Note: All references to input pressures are read from the Airtronics display board.**

**7.2 "Valve Closed" Flow point**

Turn the air supply off. With the system fully depressurized, insure that the input pressure on the display reads less than 1.5 psi. Type "0" and press <Enter>.

**7.3 Flow #1**

Turn on air supply. Confirm that the valve for the channel being calibrated is in the zero position (fully CW). Set the other channel by manually turning the needle valve to flow approximately 150 slpm (3/4 turn) (this channel will not need to be changed during calibration). Rotate the stepper motor on the channel being calibrated by turning the needle CCW to the first reading on the Master flow meter. Rotate the needle two more steps CCW. Reset the inlet pressure to 85.0 +/- .1 psi dynamic. Pause for five seconds to allow the digital filter to stabilize. Enter the Master Standard measured flow value and press <Enter>.

**7.4 Flow #2 through #10**

Proceed with data point 2 by turning the needle two steps CCW, checking and adjusting the input pressure to 85.0 +/- .1 psi, pausing for five seconds to allow the digital filter to stabilize, and entering the measured value. Repeat this step for the next data points until data point #11 is reached.

**7.5 Flow #11 through #18**

The following is a list of points to calibrate. Rotate the stepper motor on the channel being calibrated by turning the valve CCW until the predetermined set point slpm is being displayed on the Master Standard. The points may be off the predetermined set point by 3 slpm for flows 100-400, and 4 slpm for flows 400-770. Adjust the inlet pressure to 85.0 +/- .1 psi on the display board and readjust stepper motor, if necessary. Pause for five seconds to allow the digital filter to stabilize and then enter the value shown by the Master Standard. Do this for every point listed.

Flow 11	124 slpm
Flow 12	161 slpm
Flow 13	209 slpm
Flow 14	272 slpm
Flow 15	353 slpm
Flow 16	458 slpm
Flow 17	562 slpm
Flow 18	665 slpm

## 7.6 Maximum Flow

Rotate the stepper motor on the channel being calibrated by turning the valve counterclockwise until 770 slpm is being displayed on the Master flow meter. Maintain inlet pressure at 85.0 psi as read on the AirTronic Display Module. Pause for five seconds to allow the digital filter to stabilize. Enter the value that is displayed on the Master flow meter into the terminal and press <Enter>.

## 7.7 Save Calibration

Save the calibration data by pressing "Y" <Enter>. Cycle the test cabinet power to home the valves (the filter constant automatically defaults to "8").

## 8. Review the Calibration Data

Press <Enter>. Enter the correct number choice to display the calibration data of the channel that was calibrated (3 or 4). Inspect the two columns of data for constantly increasing numeric values from top to bottom. If the data points do not follow ever-increasing values then that channel will need to be re-calibrated.

## 9. Calibration Test

Turn on the power. Trigger the calibrated channel on. Leave the other channel off. Set and record all the actual flow values shown on the Master Standard starting with 50 slpm and increasing by 50 slpm. Always maintain 85.0 psi (measured on the Airtronic Display Module) on the inlet for each flow point. The actual flow values must not vary more than 7 slpm from the setpoint (if this accuracy is not met, cycle the power, retest, and re-calibrate if necessary - low flows may indicate the digital filter did not stabilize). Continue to change the setpoint and record the Master Standard value until 750 slpm is reached. If the accuracy is met, then the channel is calibrated. Record both software versions on the test form.

### 9.1 Cycle Test

Turn off all triggers. Cycle the power to the Airtronics to home the valves. Set flow rate of the calibrated channel to 500 slpm. Turn on the channel trigger. Adjust the input air to 85 +/- .1 psi if necessary. Record the actual flow rate as indicated by the Master Standard. Cycle the trigger 7 times and record the flow rate after each. The variance from the low value to the high value must be less than 7 slpm. Variances greater than seven may indicate a faulty air flow orifice, p/n A10418.

### 9.2

Return to the beginning of step 7.1. "Calibration" to calibrate the other channel.

### 9.3

On the "Hyper Terminal" window, click "transfer", "capture text", and select "stop".

**Table #1**

AirTronics Test Data Sheet																		
Date	Unit		Insp	Calibration Test Setpoints														
	Serial Number	Ch #		50	100	150	200	250	300	350	400	450	500	550	600	650	700	750
				Status: Actual Flow														
		1																
		2																
500 slpm Flow Actual Flow CH1:																		
500 slpm Flow Actual Flow CH2:																		
Status:	<input type="checkbox"/> after calibration		<input type="checkbox"/> after break in test															
Date	Serial Number	Ch #	Insp	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750
					Actual Flow													
		1																
		2																
500 slpm Flow Actual Flow CH1:																		
500 slpm Flow Actual Flow CH2:																		
Status:	<input type="checkbox"/> after calibration		<input type="checkbox"/> after break in test															
Date	Serial Number	Ch #	Insp	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750
					Actual Flow													
		1																
		2																
500 slpm Flow Actual Flow CH1:																		
500 slpm Flow Actual Flow CH2:																		
Status:	<input type="checkbox"/> after calibration		<input type="checkbox"/> after break in test															
Date	Serial Number	Ch #	Insp	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750
					Actual Flow													
		1																
		2																
500 slpm Flow Actual Flow CH1:																		
500 slpm Flow Actual Flow CH2:																		
Status:	<input type="checkbox"/> after calibration		<input type="checkbox"/> after break in test															

# *AirTronics Field Calibration Procedure*

## **10 Break-In Test**

### **10.1**

Cycle both channels for a minimum of 4 hours at 750 slpm.

### **10.2**

Install the Master Standard flow meter in the output of the channel to be tested and retest calibration accuracy per section 12 of procedure and record the results.

### **10.3**

Trigger channel 1 and slowly increase the flow setpoint from zero using the display board "Local Adjustment" pot. The servo must move slowly and not backup as if going to a different flow rate. Continue to check servo until the flow rate equals maximum.

### **10.4**

Perform the above check on channel 2.

### **10.5**

When completed, attach a sticker to back plate of unit with the date and initials of who tested it.

### **10.6**

Completely fill out all areas of form Table #1 for each unit.

#### **Manufacturing**

1910 North Wayne Street  
Angola, Indiana 46703-9100  
Telephone: 260/665-8800  
Fax: 260/665-8516

#### **Technical/Service Assistance**

Automotive Assembly and Tier I Telephone: 800/ 626-3565 Fax: 419/ 470-2040  
Industrial Systems Telephone: 800/ 233-3366 Fax: 419/ 470-2071  
Ransburg Guns Telephone: 800/ 233-3366 Fax: 419/ 470-2071

**Technical Support Representative will direct you to the appropriate telephone number for ordering Spare Parts.**