

# Hoffman Controls

## Installation & Operating Instructions

203-5 (24)V Series

### Velocity Pressure Transducer

#### Description

This instruction is a guide for connecting and operating the 203-5 (24)V Velocity Transducer. This Transducer provides an output signal that is proportional to the air flow through the duct.

The 203-5(24)V series of controls are available in 3 standard ranges. Each range is identified with an "A", "B", or "C" suffix in the model designation as shown below. Always select the lowest range that will accomplish the control objective.

203-5A(24)V provides 2-10vdc over 0-2000 fpm.

203-5B(24)V provides 2-10vdc over 0-3000 fpm.

203-5C(24)V provides 2-10vdc over 0-4000 fpm.

When controlling velocity (fpm) with a 709 series controller, a 265-PI "plug in" Interface card will be required when control at a setpoint without signal error is desired.

Complete details on control methods using 203-5 series transducers are available in the 709 & PI Interface Application Notes documentation.

#### Installation

##### Wiring

1. Use 20 AWG wire or larger for all connections. Keep output signal wires separated from power lines to avoid signal interference.
2. When 24 VAC is applied to the circuit, one side of the transformer secondary may be tied to ground through the terminal labeled "GND".
3. Both terminals labeled "GND" are circuit grounds in common.

##### Installation

1. The transducer may be mounted directly to the side of the duct using sheet metal screws.
2. Locate the transducer so that the pneumatic tubing length does not exceed 18 inches from the velocity pickup in the duct to the on-board velocity probe. Choose the longest velocity probe that the duct diameter will accommodate without protruding through the opposite side and is at least 1/2 of the duct diameter.

See Figure 1 for probe length example.

3. Industry approved pneumatic tubing for connecting the on-board transducer must be used. No air leaks in the tubing or connections are allowed for accurate calibration of velocity.

See Figure 2 for determining which velocity tube end goes to "HI" or "LO" pressure.

4. Avoid sharp bends and kinks in the pneumatic tubing. This will insure an exact amount of calibrated air to flow through the velocity probe.

5. If tubing must be removed from the probe barbs, always cut off the tubing lengthwise at the barb. Gently remove the tubing.
6. Verify operational flow (fpm) is not below limits as per the graph of Velocity vs DC output Voltage as shown in Figure 5.
7. Always use twisted pair wire for establishing signal connections.

#### CAUTION



**Do not attempt to pull tubing off of the sensor barbs. (The transducer tips provide calibrated orifices and must not be damaged.)**  
Cut tubing off if required.

#### Operation

1. Connect the 203-5(24)V transducer, as shown in Figures 3&4, when using a Hoffman Controls 709 Series Control with the 265 PI Interface option.
2. Terminals "VOU" & "GND" are the output for 2.0-10.0 vdc. Connect *BOTH* "VOU" & "GND" to the input of the control. The load impedance should be 10,000 ohms or greater.
3. Apply an uninterrupted 24V AC source to the 203-5 (24)V Series transducer.
4. The output will be proportional to airflow in the duct when the Velocity Pressure Pickup Part No. 520-86V is used.
5. It is the intent that this transducer be used in a system that will accept the 2.0-10.0 vdc Velocity Output signal from this transducer.
6. Quick Transducer Test:
  - a. Connect Digital Voltmeter (DVM) across the terminals labeled "VOU" & "GND".
  - b. Pinch hose so no air flows.
  - c. Voltage at DVM should read 2 volts +/- 0.1.
  - d. Let air flow through the tubing. The DVM should read greater than what was read when no air flow was in the tubing.

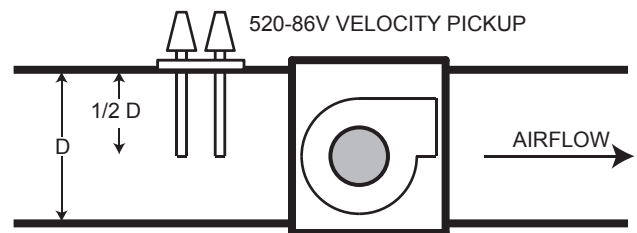
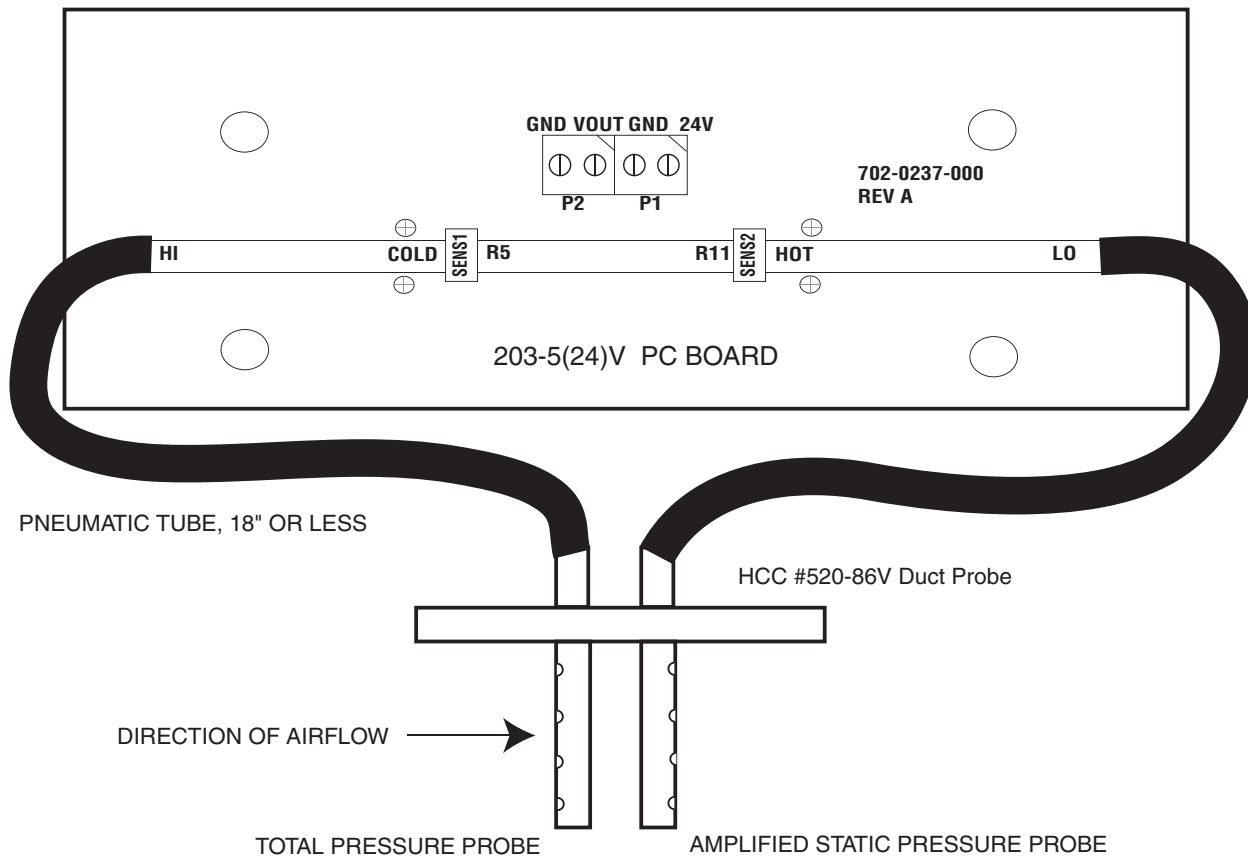


Figure 1 - Duct Probe Length

Pickup may be on negative or positive side of blower as required.



**Figure 2** - Pneumatic tubing connections to Model 520-86V Duct Probe

## Troubleshooting

### Transducer Problem #1

Air is flowing greater than 200 ft. per minute (FPM), but the output voltage is near zero volts.

#### Cause

- Pneumatic tubing pinched.
- Pneumatic tubing not connected.
- Power is not at 24V AC (+15% - 10%).
- Lead broken on velocity probe.

### Transducer Problem #2

Output voltage will not reach 9.0 - 10.0V DC when motor is running at full speed

#### Cause

- Air velocity is not sufficient. Blower selection (size) is not adequate to deliver velocity at the desired level.
- The load to the controller is less than 10K ohms
- Tubing may be pinched or has an air leak.
- Obstruction in duct may be prohibiting flow.

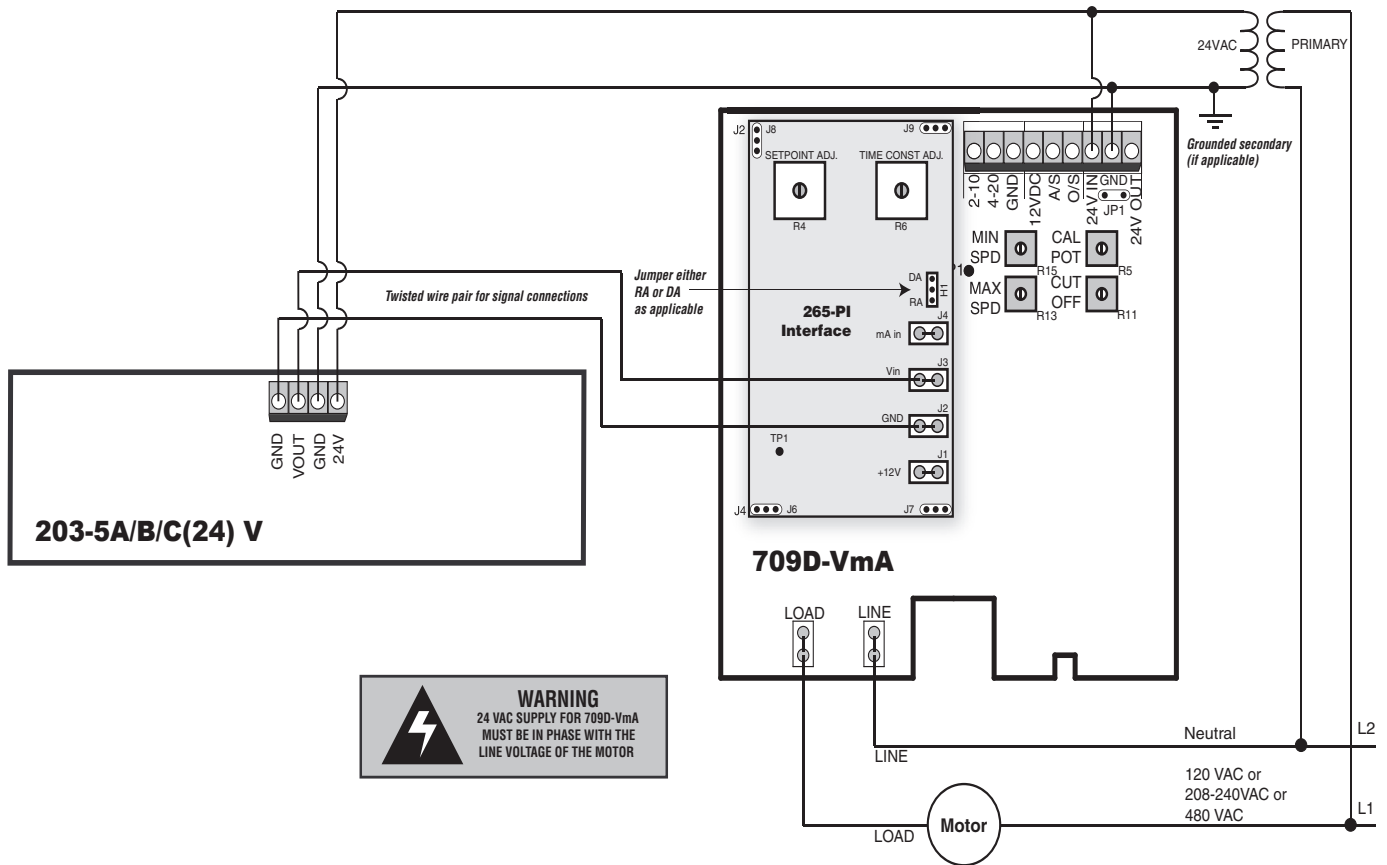


Figure 3 - Electrical connections to Model 709D Vma(PI) Controller

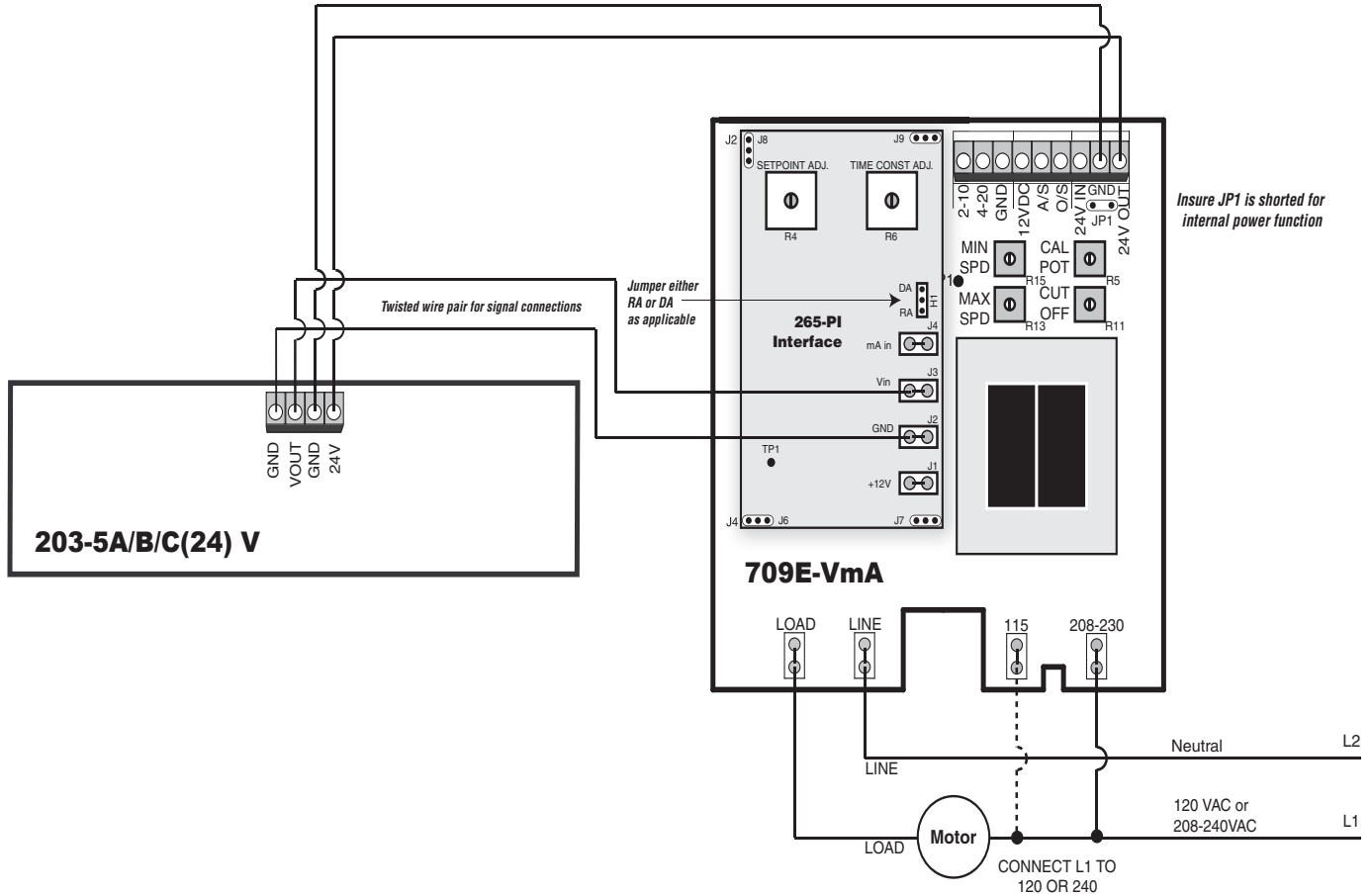


Figure 4 - Electrical connections to Model 709E Vma(PI) Controller

# Velocity (FPM) vs. DC Voltage Output Curves

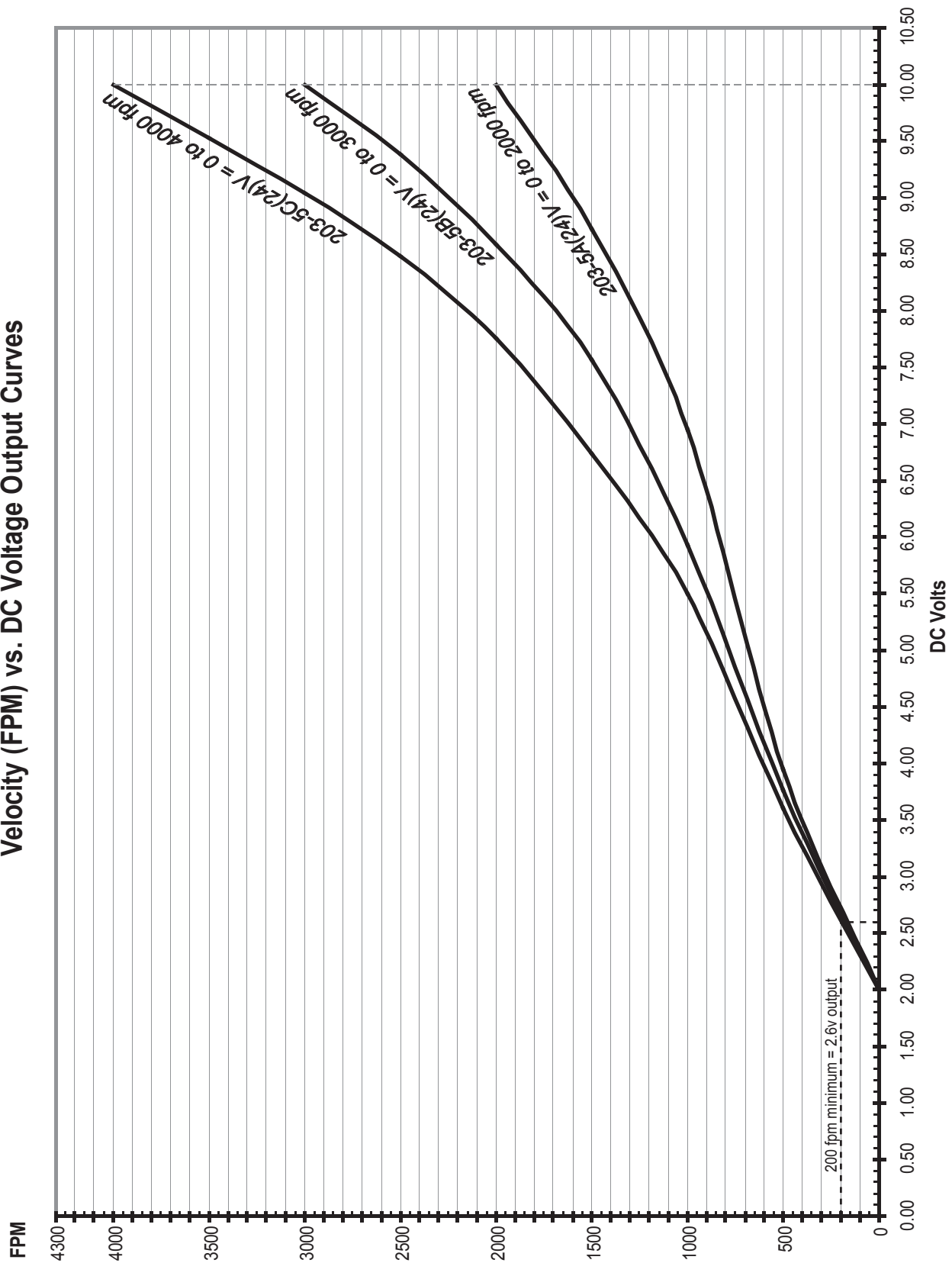


Figure 5 - 203-5 Series Output Response Curves

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