This installation manual provides information for installing and configuring the Loren Cook Company constant pressure control system. The system requires a Loren Cook Company fan with an Electronically Commutated, EC, motor with external speed control capability. The manual does not cover any other installation details or applications.

Carefully read this publication and any supplemental documents prior to any installation or maintenance procedure.

For additional safety information, refer to AMCA publication 410-96, Safety Practices for Users and Installers of Industrial and Commercial Fans. This document and all Cook publications may be obtained from Cook by phoning (417) 869-6474, extension 166; by FAX at (417) 832-9431; or by e-mail at info@LorenCook.com. All Cook publications are available on LorenCook.com.

For information and instructions on special equipment, contact Cook at (417) 869-6474.

Location and Maintenance
Consider the following points while choosing a location for the Vari-Flow Pressure Controller.

- Install the controller indoors.
- Do not place the controller on the floor.
- Maintain a temperature between 0°C to 40°C (32°F to 104°F). A temperature beyond this range may cause condensation and sweating of metal parts.
- Maintain a low humidity, dry, and clean atmosphere. Ensure that the controller is not in the path of blowing dust, rain, or snow.

Follow these guidelines prior to installation.

- Clean the components to remove any deposit of dirt, water, ice, or snow and wipe them dry.
- Dry components using a portable electric heater to remove any buildup of moisture.
- Allow the cold metal parts to reach room temperature to avoid sweating.

Installation
The following steps and components are important to the proper operation of the Pressure Controller.

Pressure Tap
Pressure taps are used to connect the controller to the environment being measured. Use pressure taps by placing them in the respective duct or room that needs control. Follow these guidelines while mounting the pressure taps.

- Ensure that there are no kinks along the length of the pressure tube.
- Do not pinch the pressure tube.
- Form a drip loop in the tubing as it enters the pressure controller. This avoids condensation build up inside the pressure tube and damages to the controller’s sensor.
- Drip loop should be at least 1” (25 mm) greater than highest measured pressure (as measured in inches, w.c.) factoring in error conditions in the system. (Example: If static pressure is being measured in 4” w.c., then the bottom of drip loop should be 5” or more below the high pressure port.)
Duct Pressure

Location and Positioning

Obtaining optimum results from positioning the duct pressure tap is dependent on the planning and layout of the system.

- Install the pressure tap on a duct with a minimum of 1.5 duct diameters of straight duct. Place it away from any damper, elbow, or other obstructions.
- Ensure that the pressure tap is placed toward the top of a duct that runs horizontally. This minimizes condensation entering the tube.
- On a rectangular duct mount, place the pressure tap away from the corners.
- On a stack system, place the pressure tap at a distance of one-third from the bottom of the duct.

Installation

- Remove any exterior insulation. If required, insulation could be replaced after the installation.
- Drill a 3/8” (9.525 mm) hole in the duct where the pressure tap should be installed.
- Place the 6” (152 mm) tube into the hole and move the mounting base up to the duct in any orientation.
- On a round duct, rotate the tap so that the mounting holes are aligned with the duct.
- Attach the duct pressure tap to the duct using self-drilling zip screws, fitting in the gasket evenly.
- Attach the tubing from the barbed port to the pressure controller.

Duct Velocity or Air Volume

Location and Positioning

Obtaining optimum results from positioning the pressure taps is dependent on the planning and layout of the system.

- If you are using total and static probe to measure velocity pressure, mount the pressure taps in close proximity to each other but in such a way so as not to interfere with each other. For this, select a spot in the duct that is at least 5 duct diameters away from any obstructions such as elbows, dampers, transitions, or diffusers.

Room Pressure

- Identify the area(s) in which you intend to control the static pressure.
- Mount the pressure tap near the center of the zone that you intend to measure.
- Do not mount the pressure tap in an enclosed area such as a closet and areas that are prone to drafts.

Static Pressure Control

- Place the Pressure Controller box as close as possible to the pressure tap and fan. The location should be easy to access.
- Keep the length of the wiring between control box and the fan to 100 feet (30 m) or less.
- Keep the length of the pressure tubing between control box and pressure taps to 50 feet (15 m) or less.

One Duct Tap

The One Duct Tap maintains a constant pressure in the duct. The constant pressure is relative to ambient pressure of space where the Pressure Controller is mounted. To connect the One Duct Tap:

- Use a 1/8” (3.175 mm) tubing to connect between the pressure tap and HIGH pressure port on the Pressure Controller.
- Leave the LOW pressure port open to the atmosphere.

One Room Tap

The One Room Tap maintains a constant pressure in a room. The constant pressure depends on the value of the space pressure where the Pressure Controller is mounted. To connect the One Room Tap:

- Use a 1/8” (3.175 mm) tubing to connect between the pressure tap and HIGH pressure port on the Pressure Controller.
- Leave the LOW pressure port open to the atmosphere.
Two Room Taps

The Two Room Taps maintain a constant differential pressure between two rooms. This constant differential pressure enables the controller to monitor and regulate the pressure through the Pressure Controller when placed at a remote location. To connect the Two Room Taps:

- Use a 1/8" (3.175 mm) tubing to connect between the pressure tap in the high pressure room and the HIGH pressure port on the Pressure Controller.
- Use a 1/8" (3.175 mm) tubing to connect between the pressure tap in the low pressure room and the LOW pressure port on the Pressure Controller.

Velocity Pressure Control

One Duct Static Tap and One Duct Total Tap

The One Duct Static Tap and One Duct Total Tap maintain a constant velocity pressure in a duct. This constant velocity pressure enables the controller to modulate the airflow automatically to compensate for filter or coil loading. To connect the Duct Static and Total Tap:

- Use a 1/8" (3.175 mm) tubing to connect between the total pressure tap and HIGH pressure port on the Pressure Controller.
- Use a 1/8" (3.175 mm) tubing to connect between the static pressure tap and LOW pressure port.

In this configuration, the Pressure Controller maintains a velocity pressure by measuring and maintaining the difference between total and static pressure read at the HIGH and LOW pressure ports. To set up the controller, calculate the required velocity pressure based on the intended CFM and duct area using the following formula:

\[ V_p = \left( \frac{CFM}{A \cdot 4005} \right)^2 \]

where A is the duct area in ft²

Set the desired pressure setpoint parameters from the Programming menu (see Programming). To verify the airflow calculation, take external CFM measurements and calculate the velocity pressure until the desired airflow is achieved.

Programming

Press the menu button \( \star \) to enter programming mode. Once in programming mode, the menu button always advances to the next step. Use the arrow keys to change the value of the current menu item. Press and hold an arrow key to scroll rapidly through the values. Changes are automatically saved. The Vari-Flow Pressure Controller automatically exits the menu after 20 seconds of inactivity.

<table>
<thead>
<tr>
<th>Step</th>
<th>Display</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pr:X.XXX Sp:X.XX</td>
<td>Operation Mode &amp; Setpoint Adjustment</td>
<td>Increment of 0.01 Units - in w.c. (inches of water column) Range - 0.00 to 1.99</td>
</tr>
<tr>
<td>2</td>
<td>Deadband (range: 0.000-0.243)</td>
<td>Deadband Adjustment</td>
<td>Default: 0.014 (SPC 1.0), 0.0014 (SPC 0.1) Increment: 0.005 (SPC 1.0), 0.0005 (SPC 0.1)</td>
</tr>
<tr>
<td>3</td>
<td>Response Speed: (range: 1-25)</td>
<td>Response Speed Adjustment</td>
<td>1 to 25 (factory setting: #2) 1 lowest: (100 mV/sec, 100 seconds for a 0-10 Vdc output). 25 fastest: (1.78 V/sec, 5.6 seconds for 0-10 Vdc output).</td>
</tr>
<tr>
<td>4</td>
<td>Cntl Out</td>
<td>Output Signal Adjustment</td>
<td>▲ or ▼ = 0-10 Vdc / 2-10 Vdc</td>
</tr>
<tr>
<td>5</td>
<td>Direct Act:</td>
<td>Direct acting output configuration</td>
<td>▲ or ▼ = Vdc or mA (Set to Vdc for EC motor control)</td>
</tr>
<tr>
<td>6</td>
<td>Reverse Act:</td>
<td>Reverse acting output configuration</td>
<td>▲ or ▼ = Vdc or mA (Set to Vdc for EC motor control)</td>
</tr>
<tr>
<td>7</td>
<td>Contact:</td>
<td>Relay configuration</td>
<td>Direct or Reverse</td>
</tr>
<tr>
<td>8</td>
<td>Contact On:</td>
<td>Relay SETPOINT (Sp) to come ON</td>
<td>Contact Direct: 0.31-2.00 &quot;wc Contact Reverse: 0.00-0.31 &quot;wc</td>
</tr>
<tr>
<td>9</td>
<td>Contact Off:</td>
<td>Relay SETPOINT (Sp) to turn OFF</td>
<td>Contact Direct: 0.00-0.31 &quot;wc Contact Reverse: 0.31-2.00 &quot;wc</td>
</tr>
</tbody>
</table>
Wiring

We strongly recommend that each product be wired to a separate grounded transformer and that the transformer shall service only these products. This precaution will prevent interference with and/or possible damage to incompatible equipment.

Contact Modes/Actions

Direct Acting

- OFF  ON + Pressure Differential
K_in = Open  K_no = Closed
K_in = Closed  K_no = Open

Reverse Acting

- OFF  ON + Pressure Differential
K_in = Closed  K_no = Open
K_in = Open  K_no = Closed

Legend
Dashed = Open
Solid = Closed

Limited Warranty

Loren Cook Company warrants that your Loren Cook fan was manufactured free of defects in materials and workmanship, to the extent stated herein. For a period of one (1) year after date of shipment, we will replace any parts found to be defective without charge, except for shipping costs which will be paid by you.

This warranty is granted only to the original purchaser placing the fan in service. This warranty is void if the fan or any part thereof has been altered or modified from its original design or has been abused, misused, damaged or is in worn condition or if the fan has been used other than for the uses described in the company manual. This warranty does not cover defects resulting from normal wear and tear.

To make a warranty claim, notify Loren Cook Company, General Offices, 2015 East Dale Street, Springfield, Missouri 65803, explaining in writing, in detail, your complaint and referring to the specific model and serial numbers of your fan. Upon receipt by Loren Cook Company of your written complaint, you will be notified, within thirty (30) days of our receipt of your complaint, in writing, as to the manner in which your claim will be handled. If you are entitled to warranty relief, a warranty adjustment will be completed within sixty (60) business days of the receipt of your written complaint by Loren Cook Company.

This warranty gives only the original purchaser placing the fan in service specifically the right. You may have other legal rights which vary from state to state.

For fans provided with motors, the motor manufacturer warrants motors for a designated period stated in the manufacturer’s warranty. Warranty periods vary from manufacturer to manufacturer. Should motors furnished by Loren Cook Company prove defective during the designated period, they should be returned to the nearest authorized motor service station. Loren Cook Company will not be responsible for any removal or installation costs.

PROBLEM AND POTENTIAL CAUSE

Controller does not hold setpoint pressure

Cause:
- Incorrect minimum distance
- Kinks or punctures in the tubing.

Corrective Action:
- Ensure that the pressure taps are located at a minimum distance of 1.5 duct diameters upstream or downstream from any dimensional change, elbow, damper, or other obstruction.
- Verify and ensure that there are no kinks or punctures in the tubing between the Pressure Controller and the pressure taps.

Unstable Fan Speed

Cause:
- Kinks or punctures in the tubing.
- Response Speed set too high.

Corrective Action:
- Verify and ensure that there are no kinks or punctures in the tubing between the Pressure Controller and the pressure taps.
- Adjust the response speed from the Programming Menu (see Step 3 - Programming).

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