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## *Poultry Housing Tips*

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Negative Pressure Ventilation - Inlet machines

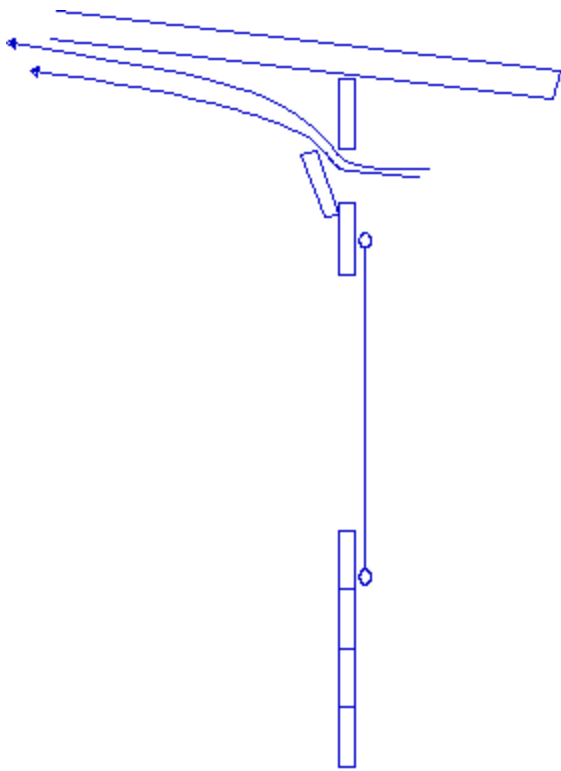
January, 1993

The number, as well as size, of air inlets recommended for negative pressure houses has steadily increased over the years. Ten years ago, a 400' house may have had only ten or twenty 4" X 4' inlets (13 ft<sup>2</sup>), if any at all. Today, many new houses have over fifty 7" X 4' inlets (140 ft<sup>2</sup>). The dramatic increase in inlet area has given producers a higher level of control over house temperature, air quality, and fuel usage. The more control a grower has over these factors, the more control he has over his paycheck.

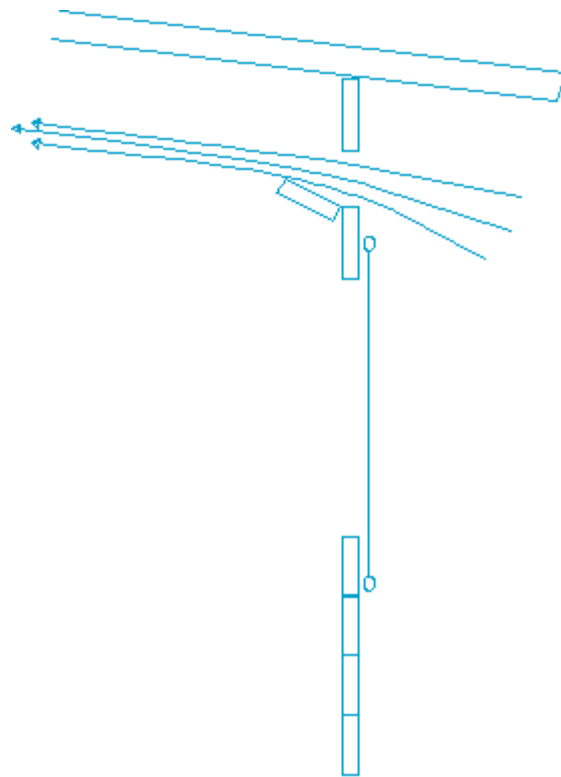
Ten small inlets allow a producer to operate a maximum of two to four 36" fans, depending on house tightness. There simply are not enough openings for more fans to draw air through. Ten inlets are fine for providing minimum ventilation, but so few inlets do not offer the producer much flexibility. For example, a producer with only the capacity to operate a few 36" fans may have to switch to curtain ventilation while it is still fairly cold outside, i.e., 50°F. This can lead to drafty conditions and litter caking. Also, the producer has to be present to switch from fans to curtains whenever it starts to get just a little warm outside. If he is not there, house temperature will increase and production could suffer.

In modern tunnel-ventilated houses the number and size of fans has increased dramatically. Though these fans are primarily thought of as being used for summertime ventilation, they also can make ventilation a lot easier during the winter, spring and fall if enough inlets are present. Tunnel fans and side wall inlets allow the producer to power ventilate whenever he wants and take much of the guess work out of ventilation. With an adequate number of side wall inlets, a producer can operate as few as two or three 36" fans up to as many as seven 48" fans. A grower could, if he wanted, power ventilate through his inlets until outside temperature reached 75°F. At that time he could switch over to curtain ventilation or go straight into tunnel ventilation. On the other hand, he would have the capability of going to curtain ventilation when the temperature reaches 60°F and tunnel ventilation when it reaches 80°F. The decision is up to the grower. The key to this flexibility is that the house has to have a relatively large number of adjustable side wall inlets.

One problem encountered with having a large number of inlets and fans is that inlet openings require adjusting as fans turn on or shut off. The amount of inlet opening necessary to operate two 36" fans is very different than that needed to operate four 48" fans. Two 36" fans may require the inlets in the house to be only slightly opened (Figure 1), while four 48" fans may require the sidewall inlets to be opened 5" or more (Figure 2). Basically, the more fans operating the greater the inlet opening required.

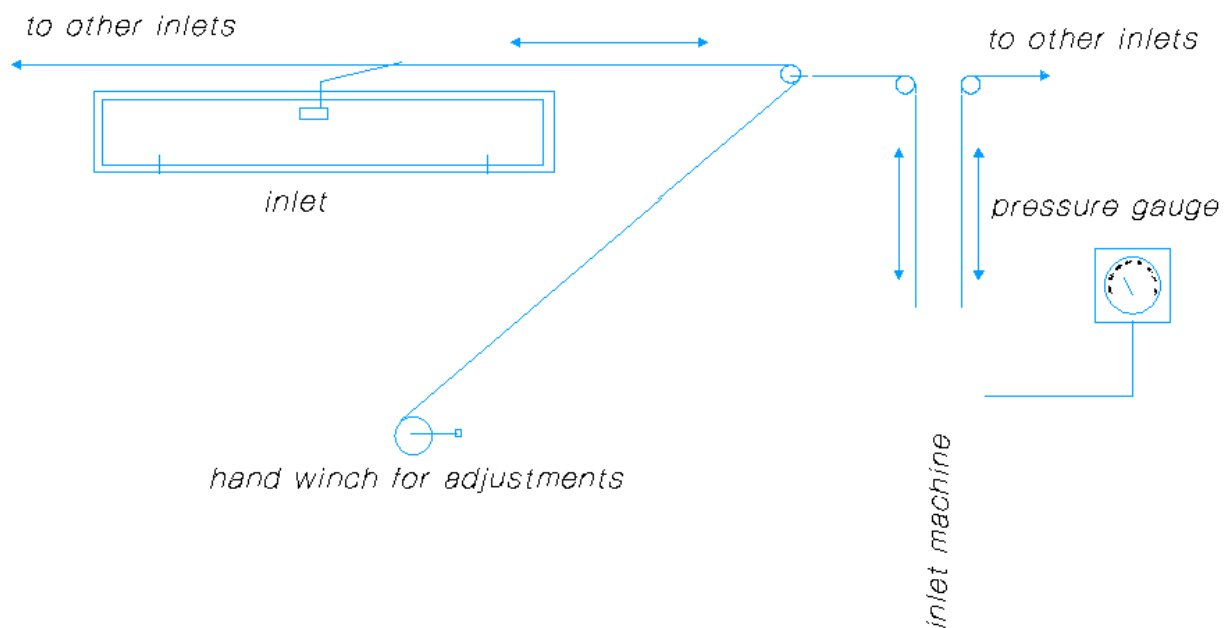


**Figure One**



**Figure Two**

To get away from continuously having to manually adjust side wall inlets many producers have installed inlet machines. An inlet machine is more or less a curtain machine for inlets. As outside temperature increases, more and more fans come on, and the inlet machine opens the inlets wider and wider. Conversely, as outside temperature decreases, exhaust fans shut off, and the inlet machine closes the inlets.



An inlet machine adjusts the amount of inlet opening according to how much negative pressure or vacuum the exhaust fans are creating. Ideally, when using inlets, a negative pressure of between 0.05"

and 0.10" is required. If the static pressure is below 0.05", the air entering the inlets will drop to the floor before it has enough time to mix with the warm air next to the ceiling. If the static pressure is above 0.10" the fans ability to bring in fresh air is reduced.

Inlet machines adjust the inlet opening to maintain a static pressure within a range set and controlled by the producer. Using the range mentioned above, an inlet machine would attempt to maintain a pressure between 0.05" and 0.10" whenever fans were operating in the house. If a fan came on and the static pressure went above 0.10" the inlet machine would open the inlets. If the static pressure dropped below 0.05" because a fan shut off, the inlet machine would close the inlets until the pressure fell back within the proper operating range. If all the fans went off, the machine will completely close the inlets.

The inlet machine takes a lot of the guess work and labor out of power ventilation. The grower basically just sets his fan thermostats and the inlet machine takes care of the inlets. During the spring and fall when temperatures may range between 30°F at night and 75°F during the day, and getting ventilation right is a challenge, an inlet machine really pays for itself. Two 36" fans may operate at night increasing to four 48" fans running during the day. The inlet machine will adjust the inlets throughout the day so that there is always just the right amount of opening to provide optimum house conditions.

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