The Alabama Poultry Engineering and Economics
Auburn University NEWSLETTER No 18, July 2002

Feature article

Is Your Standby Generator Set to Go? Alarms Ready? Breakers and Wiring in Good Shape? Are Your Backups Set?

The consequences of power loss or ventilation failure are too great to ignore. Especially in hot weather, we must have backup systems and alarm systems in place and ready to operate. We need to know immediately if something goes seriously wrong in a house (alarms), and if possible we want some piece of equipment to automatically operate to help save the birds until we can get there (backups).

What Alarm Systems Must Do

Alarms simply warn you if something goes wrong in the house. ALARMS DO NOTHING TO SAVE YOUR BIRDS. They only call you to get there on the double to see what the problem is and fix it. All alarm systems should operate both a local siren and an automatic phone dialer/pager to notify you of a problem if you are away from the farm. There are two situations you need to be alarmed about:

The most common cause of bird loss is human error – failure to maintain and reset alarms and backups.

1. If utility power fails, a battery-powered alarm system must alert the grower, both by siren and by a phone dialer/pager. This alarm should go off whether a standby generator starts or not. You need to know when you lose power.

2. If in-house temperature goes way off-target, the alarm system must warn you of this threat to the birds. This kind of emergency is usually caused by equipment failures such as a fan belt breaking, a fan motor burning out, a fan breaker tripping, a circuit breaker burning up, a thermostat failing, or a tunnel inlet machine malfunctioning. High heat is the most dangerous threat to birds. Too low temperatures can be detrimental to flock performance and in some situations can also cause bird losses, and most alarm systems also warn of low temperatures.

Temperature limits for thermalarms or sensor-based high-heat alarms should be checked or reset as part of the regular daily management practice, and especially during the first part of the growout, since the target temperature and bird comfort zone changes day by day. In certain times of the year or growout, it may be advisable to reset alarms each morning and evening. This is true for both thermostat and controller-operated houses. A rule of thumb is to set alarm limits at 8-10 degrees above or below target temperature. This can vary according to the particular situation, flock age, time of year or growout, etc.

Alarm temperature setpoints should be checked or reset daily.

An exception to the 8-10 degrees above or below rule of thumb might be made when the house is in tunnel ventilation. When the wind-chill effect kicks in, birds may be quite comfortable in a temperature 8-10 degrees above target. To prevent alarms from going off when there is no actual reason for concern, alarms might be reset up to 12-13 degrees above target temperature during tunnel ventilation. *If this is done, you must lower the alarm settings back down to 8-10 degrees above target when the house goes back into power ventilation mode.*

How Alarms Work

Stand-alone alarms. Battery-powered alarms use a spring-loaded relay which is held open as long as there is electric power present. If this power fails, the relay closes and sends battery power to a siren and a phone dialer. Stand-alone alarms should be wired to 240 volts, so they will be activated if either leg of the 240-volt service is lost. These alarms have been standard equipment on poultry farms for years and should remain the primary defense against catastrophic losses for both thermostat and controller-operated houses.

Controller alarms. Most electronic controllers have a built-in alarm capability which can activate a siren and dialer/pager, but a stand-alone alarm should be installed as the primary power loss and high heat alarm. In addition to setting off siren and dialer alarms for serious problems, controllers include “soft” alarms on the control panel such as blinking lights, a pop-up screen, or a flashing alert message, to alert you to various

kinds of equipment failure that do not immediately threaten birds.

For example, if one of a house's six temperature sensors fails, the controller may be able to keep the in-house temperature within bounds by using the remaining five sensors (a backup function). In this situation, there would be no need for an alarm to wake a grower up in the middle of the night. So a viewing screen information display warning of the sensor failure would be all that was needed.

In addition to power loss and out-of-range temperature, controllers typically can provide either soft or loud warnings of conditions such as static pressure in the house going either too high or too low, low water pressure; and sensor or other equipment failure.

While controllers include alarm capability, a stand-alone battery system should be installed as the primary alarm.

I**mportant**: Controller internal alarm systems must be checked and reset frequently, just like stand-alone alarm systems. No alarm system is totally automatic.

Key points for keeping alarms ready:

1. Check and reset high-heat alarm temperature limits as part of your daily regular management practice.
2. Never turn your alarm system off. If you do, you'll lose your first line of defense.
3. Test your alarms before each flock and regularly during a growout.
4. Protect your dialer mechanism from lightning; they are very sensitive to power surges.

What Backup Systems Do

Backup systems kick in to actually operate some type of equipment when something goes wrong. THEY CAN SAVE YOUR BIRDS.

The basic backup device all tunnel ventilated poultry farms should have to protect against utility system power failure is a standby generator. If utility power fails in hot weather and no standby generator comes to the rescue, birds will begin dying within minutes. This means that each standby generator should be equipped with an automatic power transfer switch which will almost instantly detect a utility system failure and start the generator to take over the job of supplying electric power to the house. For more information on standby generators, see Newsletter #8, *Emergency Power for Poultry Production* (November 2000), at www.poultryhouse.com.

All tunnel ventilated broiler farms should have backup generators with automatic power transfer switches.

If utility power fails and there is no standby generator, or if the standby generator fails to start, the only possible backup is curtain drops, in a curtain sidewall house. This is the worst-case scenario, and one that we must work to prevent. Keeping circuit breakers and farm wiring in good shape and making sure the standby generator will operate are two of the most important preventative measures needed.

You the grower must also be a backup system: Develop common sense habits such as anticipating problems and checking your houses immediately after a thunderstorm, or in very hot or very cold weather when a power failure would prove disastrous.

Electronic controller-operated houses also need another kind of backup device or system. Modern electronic controllers are reliable, but it is possible for such things as power line surges and lightning strikes to cause controller loss or malfunction. Therefore, a high-heat backup system separate from the controller must be provided. This kind of backup system must override the controller relays to turn on ventilation in case of any controller malfunction that leads to loss of temperature control. There are basically four different types of controller high-heat backups, as explained below.

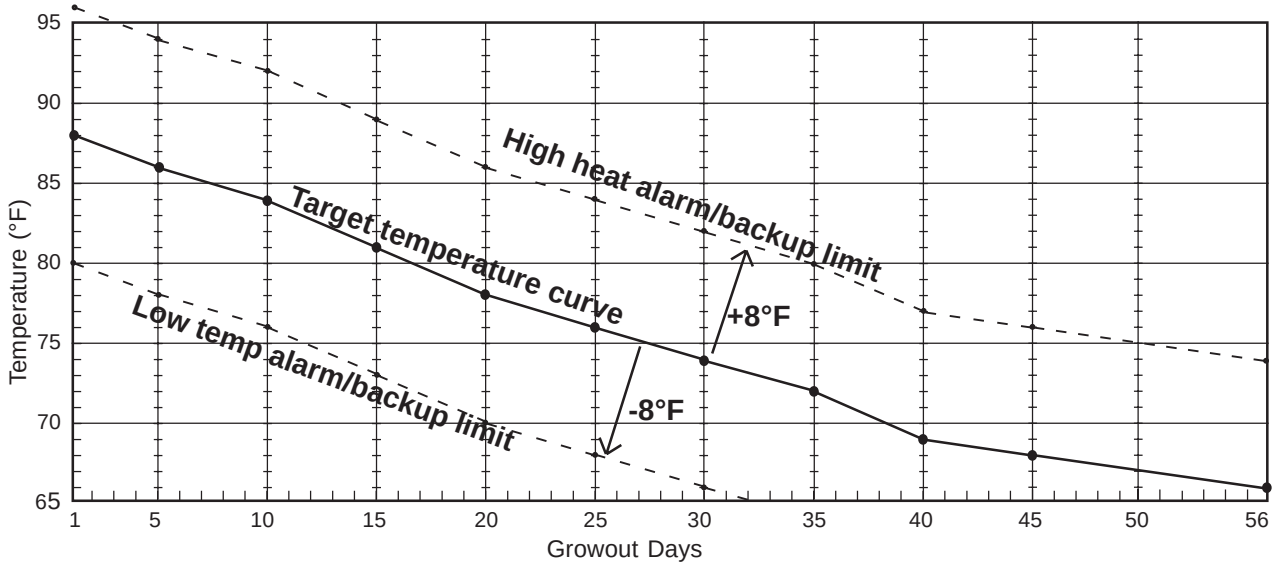
Electronic controller houses need a backup system to operate ventilation in case of controller malfunction.

How Different High-Heat Controller Backups Work

1. Separate, hard-wired thermostat backups. The simplest form of backup is to have an electrician wire conventional thermostats to fans and inlet or tunnel curtain machines. Thermostats must be located where they are easily accessible in the bird chamber and at bird level, and kept set so that they will override the controller and turn on ventilation equipment if heat goes too high and the controller fails to operate the ventilation system. To be effective, this type of backup system requires the grower to reset a large number of thermostats every day or two.

2. Packaged thermostat/relay backup systems. Most controller manufacturers offer packaged backup boxes, usually calling for four thermostats (in the bird chamber at bird level) that operate relays in the box to turn

Typical Target Temperature and Alarm/Backup Temperature Settings

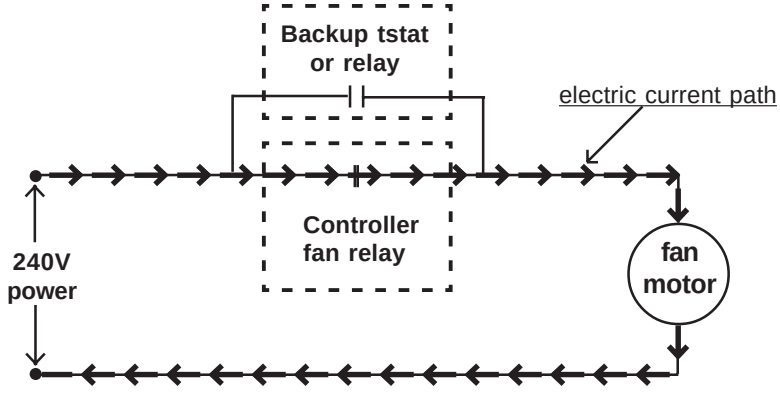


A good starting place for alarm and backup temperature settings is 8-10 degrees above and below target temperature. Alarm settings might be altered slightly for summer when in tunnel or in extreme cold weather. Settings for controller backups must always be in a range to override the controller before problems of high heat or cold are experienced in the poultry house. This graphic shows typical settings only; proper settings for your farm will vary with target temperature curve and many other factors; ask your flock supervisor for advice on settings.

How Backups Operate Fans If Controller Fails

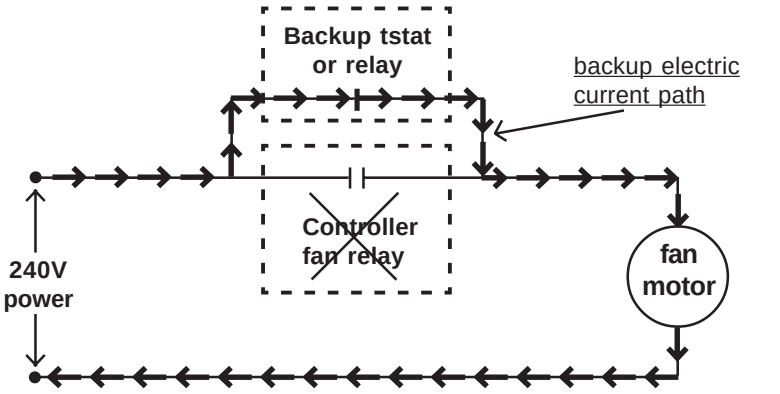
Normal Operation

Controller fan relay closes to send electric power to fan when in-house temperature rises above setting for this fan's output stage.



Emergency Backup Operation

If a controller fan relay fails to close when in-house temperature rises above the temperature limit setting, a properly set thermostat or a backup system relay will close to send electric power to the fan.



on various combinations of fans and vent or tunnel curtain machines. This option is easier to manage because there are fewer thermostats to be reset every few days.

3. Packaged sensor/relay backup systems. Another type backup box offered by some manufacturers is similar to the thermostat/relay box but uses electronic sensors instead of thermostats. The electronic sensors are more accurate in measuring temperature than thermostats, and usually, only one or two sensors are needed. Also, temperature settings are done at the box rather than at the sensors. Otherwise, a basic sensor-based backup box works in much the same way as a thermostat-based relay box backup.

4. "Smart" electronic sensor-based backups. An integrated "smart" electronic sensor backup system is also available that includes a processor "brain" similar to but more limited than the main electronic controller. The smart backup can monitor the main controller itself and if needed "fill in" for the main controller in some situations. For example, if a timer fan belt breaks, an electronic backup system monitoring static pressure may be able to respond to the low static pressure by turning on additional fans to maintain proper minimum ventilation.

Controller backup boxes should be wired to separate circuit breakers, and must be reset every day or two.

Controller backup boxes should be wired to separate circuit breakers so that the backup system is less likely to be knocked out by the same lightning strike or other problem that affected the controller.

Backup system temperature limit settings generally should be set in the range of 8-10 degrees above and below target temperature. However, growers should check with their integrator personnel to get specific recommendations that will fit their farm situation. Note that while we have emphasized the need for protecting against high heat because this is the situation most likely to result in bird losses, too-low temperatures can also be detrimental. Any of the four types of controller backups explained above can also be configured to turn on heat if needed.

Like alarm systems, backup systems for controllers must be checked and reset almost daily. Most bird losses following controller malfunction could be prevented by keeping backup temperature limits set properly.

Growers with electronic controller-operated houses should discuss backup systems with their manufacturers and be certain they understand their purposes and capabilities, along with their limitations. Backup systems may not be interchangeable from one manufacturer to another, or even one model to another.

The Bottom Line

Let's say a grower's interest in whether birds at least survive (but also hopefully thrive) is in the neighborhood of a nickel a pound. If we do some simple arithmetic, multiplying say, 25,000 birds per house times say, 6 pounds each, times a nickel, we get something like $7,500 per house. Need we say more, to explain why it is worth your while to install and maintain good alarms and backups?

ALABAMA COOPERATIVE Extension SYSTEM

The Alabama Poultry Engineering and Economics Newsletter provides up-to-date information on topics of interest to poultry production personnel, focusing on most effective and efficient uses of modern technology and equipment, with a special emphasis on economic implications. The Newsletter is published six times a year, or as needed to address emerging or special issues. Contact: Jim Donald, Extension Biosystems Engineering, 228 Corley Bldg., Auburn University, AL 36849-5626, (334) 844-4181, fax (334)-844-3548, jdonald@acesag.auburn.edu. Published by:

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