LIGHTNING B
Hay Moisture Monitor
Auto Start / Stop Model Instructions

By measuring resistance between the two parallel stainless bars of the **LIGHTNING B** sensor, a signal is sent to the monitor in the tractor which is converted into **PERCENT MOISTURE** of the hay in the bale chamber where the sensor is mounted. By using 8 inch long bars and averaging the resistance along the whole length of the bars, wet slugs and air pockets don't result in readings that vary from highs to lows. The sensor signal is read every .2 milliseconds (5000 readings per second) and the display averages the 10,000 signals and updates the readout every 2 seconds in the "**AVERAGE**" mode. This approach reduces high variations in the display, providing moisture readings that are reasonably stable and accurate. The **LIGHTNING B** monitor indicates percent moisture in a range from **5% to 37%.**

The best sensor mounting location depends on the baler you use. The sensor requires pressure of the crop to read accurately and the best location is as close to the plunger as possible, but accessible. The closer to the front, the more recent the reading will be to the product just baled from the windrow. We recommend that the sensor be mounted on the side wall of large square balers in a horizontal orientation with the bars in line with the direction of travel of the bale. For small square balers, mount the sensor on the same side as the knives. This allows better access for inspection and cleaning of build up on the bars.

For round balers, find a suitable location to place the sensor on the side wall of the chamber such that no mechanism, such as conveyor lacing pins or belts can hit the sensor.

A mounting template is included with each unit. Drill the two bolt holes first. They are 7/16 inch on 9.5 inch centers. Then drill a 1 inch hole for the coax connection. Debur the large hole to avoid shorting out the data signal and to protect your knuckles. Place the sensor inside the bale chamber, add washers, lock washers, nuts and snug, but *don't over tighten and deform the soft plastic*.

Next run one 25 foot coax cable from the sensor towards the tractor and use the male threaded adapter to connect to the second 25 foot coax cable. It runs to the mounting position you have chosen in the tractor for your monitor. If you tighten the threads on only one side of this adapter, you can prevent damage to the cables should you forget to disconnect the sensor when you drop the baler by allowing one cable to pull out of the adapter. You may want to duct tape it to prevent it from slipping apart.

There is a universal bail bracket assembly provided for mounting the monitor in the tractor. To mount this assembly to your tractor, remove the mounting plate from the bracket by removing the knobs on each side of the bracket. Mount the bracket to the cab of your tractor where you want it. Reattach the mounting plate to the bracket and then connect the coax cable to your monitor.

The input and output to the monitor is keyed to match most preservative applicators. The plug marked "**BATTERY**" is the power cable. The "**FEEDER**" plug goes from the **LIGHTNING B** to the preservative applicator and should plug directly into the input plug of that device.

The last step is to connect the 12 VDC power source. The Moisture Monitor will not operate on 6 volts or 24 volts. Unplug the "**BATTERY**" connector before wiring to the incoming power from the battery. This wire assembly comes with a spade fuse holder on the positive wire. It plugs into the female connector housing with male pins. You may need to supply wire depending on how far you run to your connection point of the tractor. After connecting to the battery including the ground wire, simply plug the connector to the "**BATTERY**" lead on the bottom left of your monitor. The Auto Start Stop model **LIGHTNING B** is fused for 20 amps. Replacement fuses are available at any automotive store.

Initial power up is done by moving the switch on the center of the monitor up or down. The center position is off. The up position is for daylight conditions where the display is on high intensity. Down is for night conditions with a softer display output.

When the monitor is powered up, the display always flashes the stored set point for what percent moisture the preservative applicator turns on and off. As first received, the display will likely read **12**. By flashing, the monitor is asking you to verify that is the set point you want to run with today. If so, push the **SAVE** button to accept it. If not, use the **UP** and **DOWN** buttons to drive the set point up or down. When you get to the set point you want, push **SAVE**.

Once you push the **SAVE** button, the display counts up from **05** to **37** by one increment every 4 seconds. Then it reads the sensor signal. If there is nothing pressing on the sensor, it will read **05**, the lowest reading the monitor displays. A direct short will read up to **37** increasing by one percent every 4 seconds, the highest reading the monitor will display. Any open circuit in the coax cable will read **05**. If there is no hay pressing on the sensor when the monitor is booted up (started), after you accept the set point, the monitor will read 05.

To protect from feeding out all of your preservative, any direct short or hay over 36% moisture, the applicator is automatically switched off.

The **MANUAL / AUTO** switch on the bottom of the monitor will provide power to the applicator controller whenever the switch is in the **MANUAL** position. This happens regardless of the position of the **LIGHTNING B** on off switch and the moisture content of the hay or if the **LIGHTNING B** malfunctions. In **MANUAL** mode, you can always operate your applicator as if the monitor is not there.

During operation, the display reads the moisture percent of the section of the bale at the sensor location, not at the pick up point. If you are going into a wet section of windrow that you want preservative to be applied to before the sensor can detect the increase in water content, there is a **MANUAL** switch on the bottom of the monitor you may switch to immediately turn on the applicator and bypass the monitor control. Once the monitor reads higher moisture than your set point, switch the **MANUAL** switch back to **AUTO** and the preservative applicator continues to run until the monitor drops below the set point.

The timing works like this. After 5 continuous seconds of reading at the set point or higher, the applicator switches on automatically and the green LED lights on the monitor. The applicator stays on until the reading remains below the set point for 20 continuous seconds. When this happens, the green LED goes out and the applicator turns off.

At any time during operation, you may push the **SET POINT** switch to change the moisture set point where the applicator turns on. When you do, the display flashes the set point the monitor is currently set on. Either accept this set point by pressing **SAVE** or adjust the set point to where you want it by pressing **UP** or **DOWN** and then press **SAVE.**

The **STANDARD LIGHTNING B** moisture monitor allows the display two options for indicating moisture content. There is a switch to the left of the display for **INSTANT / AVERAGE**. Normal operating mode is **AVERAGE**. This feature is used to prevent reading spikes for wet slugs by only allowing the monitor to increase one percent every four seconds. If a wet slug is on the sensor for 10 seconds, you will only see the reading go up by 3% and instantly back down.

In **INSTANT** mode, the display will read the real moisture measured by the sensor for each display update every 4 seconds. The monitor is allowed to indicate real time moisture with instant increase and instant decrease.

Manufactured by Tate Technology Inc. for:

AUGIES AG SALES, LLC
6776 State Route 283
Ephrata, WA 98823
509-787-1048

Web www.augiesagsales.com
email augiesagsales@gmail.com
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TROUBLESHOOTING

Almost all reported field problems are the result of a failed signal from the sensor. First make certain all coax connections are not wet or rusty and verify that all connections are plugged all the way in to each other. Switch your monitor to **INSTANT**. Short the sensor bars with a wrench or screwdriver. The monitor should read **37**. If the monitor doesn't read **37** with a short applied, you have an open condition. If you have no short applied to the sensor and get a reading of **37**, you have a short condition.

The best way to locate the location of the open or short is to start at the end of the coax cable. Remove the coax cable from the sensor and short the center pin to the threaded nut on the cable and see what the display reads. If the display says **37**, the problem is further up the cable towards the monitor. If the cable reads **05** with no load and **37** with a short applied, the problem is the sensor itself. Likely water has leaked into the wiring channel and the cover needs to be removed and the inside dried out. If you remove the cover, you will have to reseal it with silicone including around each of the screws.

Move up the coax cable to the splice point where the two 25 foot sections connect and test again. Sometimes the problem is corrosion in the male adapter connector. They are inexpensive items at any electronics store like Radio Shack. Last, short the short coax cable coming out of your monitor – center pin to threaded connector. If you don't get **37** on the monitor, the monitor is the problem. If you don't get **05** with nothing connected to the monitor, the monitor is the problem.

WARRANTY

LIGHTNING B moisture monitors and sensors are warranted against defects in materials and workmanship for a period of one year from date of purchase. In the event either the sensor or monitor requires service, ship prepaid to:

AUGIES AG SALES, LLC
6776 State Route 283
Ephrata, WA 98823
509-787-1048

www.augiesagsales.com
email augiesagsales@gmail.com

Please include a note indicating what is not functioning. Augies Ag Sales will determine in or out of warranty and advise you if there is any charge to repair your unit. The warranty does not cover misuse, mechanical damage, or if the electronics in the monitor fail when used wet. We pay return freight to you for in warranty repairs.

LIGHTNING B
Hay Moisture Monitor
Standard Model Instructions

By measuring resistance between the two parallel stainless bars of the **Lightning B** sensor, a signal is sent to the monitor in the tractor which is converted into **PERCENT MOISTURE** of the hay in the bale chamber where the sensor is mounted. By using 8 inch long bars and averaging the resistance along the whole length of the bars, wet slugs and air pockets don't result in readings that vary from highs to lows. The sensor signal is read every .2 milliseconds (5000 readings per second) and the display averages the 10,000 signals and updates the readout every 2 seconds in "**AVERAGE**" mode. This approach reduces high variations in the display, providing moisture readings that are reasonably stable and accurate. The **LIGHTNING B** monitor indicates percent moisture in a range from **5% to 37%.**

The best sensor mounting location depends on the baler you use. The sensor requires pressure of the crop to read accurately and the best location is as close to the plunger as possible, but accessible. The closer to the front, the more recent the reading will be to the product just baled from the windrow. We recommend that the sensor be mounted on the side wall of large square balers in a horizontal orientation with the bars in line with the direction of travel of the bale. For small square balers, mount the sensor on the same side as the knives. This allows better access for inspection and cleaning of build up on the bars.

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There is a universal bail bracket assembly provided for mounting the monitor in the tractor. To mount this assembly to your tractor, remove the mounting plate from the bracket by removing the knobs on each side of the bracket. Mount the bracket to the cab of your tractor where you want it. Reattach the mounting plate to the bracket and then connect the coax cable to your monitor.

The last step is to connect the 12 VDC power source. The Moisture Monitor will not operate on 6 volts or 24 volts. For the Standard Model, there is a connector assembly with 6 feet of cable to tie into your electrical system on the tractor. The center pin of this connector is positive and the positive wire has a spade fuse holder. The standard model **LIGHTNING B** is fused for 3 amps. Replacement fuses are available at any automotive store.

Initial power up is done by moving the switch on the center of the monitor up or down. The center position is off and the display is not illuminated. The up position is for daylight conditions where the display is on high intensity. Down is for night conditions with a softer display output.

When the monitor is powered up, the display rapidly counts up from **05** to **37** and holds at **37** for 4 seconds. Then it reads the sensor signal. If there is nothing pressing on the sensor, it will read **05**, the lowest reading the monitor displays. If there is a short across the bars, it will read **37**. Any open circuit in the coax cable will read **05**. If there is hay against the sensor when the unit is switched on, the monitor will read the actual moisture after it completes its boot up sequence.

The **STANDARD LIGHTNING B** moisture monitor allows the display two options for indicating moisture content. There is a switch to the left of the display for **INSTANT / AVERAGE**. Normal operating mode is **AVERAGE**. This feature is used to prevent reading spikes for wet slugs by only allowing the monitor to increase one percent every four seconds. If a wet slug is on the sensor for 10 seconds, you will only see the reading go up by 3% and instantly back down.

In **INSTANT** mode, the display will read the real moisture measured by the sensor for each display update every 4 seconds. The monitor is allowed to indicate real time moisture with instant increase and instant decrease.

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