

Topdry EMCS Autoflow Revisions

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Grain Systems Incorporated -- Top Dry Software Steve Logue @ Grain Systems, Inc.	Version: 2.24	Date: 10/1/01
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- Added Watchdog Monitoring Capability
- Increased delay on reading air switch.
- Put back Air Switch Bypass capability removed in 2.23.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.23	Date: 6/17/97
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- When a warning is displayed on the screen a corresponding number is also shown to indicate to our non-english speaking customers what has taken place to shut the dryer down.
- Took out the Air Switch Bypass capability.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.22	Date: September 18, 1995
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- Added software to insure that the fill systems and the aeration fans would shut off correctly.
- There is now a choice as to whether to clear the history or not. Push the Reset Button to access this feature.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.21	Date: September 17, 1996
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- Added software to debounce the flame circuit.
- Pressing the stop switch will now scroll through the opening screens.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.20	Date: August 26, 1996
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- Added software for the automatic watchdog caller system. If you select yes on this system after entering a phone number then the dryer will call you if it shuts down. The call repetition rate is set by the auxiliary 2 delay.
- Added software for the watchdog program.
- Also added a small delay for the flame sense to help eliminate bogus shutdowns.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.17B-1	Date: October, 1995
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- Added a special feature for switzerland - dryer will light on low flame then count down a timer delaying the high flame. Under both arrow keys.

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Grain Systems Incorporated -- Top Dry Software THIS WORKS FOR BATCH DRYING!!!!	Version: 2.17B	Date: October, 1995
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- Fixed the batch portion of AutoFlow. Made the load augers sequence off at the 3/4 load mark. Also has all the autobatch additions.

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Grain Systems Incorporated -- Top Dry Software THIS WORKS FOR AUTOFLOW DRYING!!!!	Version: 2.17A	Date: October, 1995
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- Fixed the Autobatch portion of the AutoFlow. Added a selection to determine whether the fans and dry timer start on upper or lower grain switch.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.17	Date: Sept, 1995
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- Fixed the problem with the timer reloading problems and the dryer latching at the end of the dry cycle.
- Added Screen accessed by holding down both arrow keys at the same time to allow shutting off the Wet Bin and Chamber Low Limit tests.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.16	Date: Sept, 1995
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- Attempted once again to fix the timer reloading problems. Once again I failed.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.15	Date: Sept 13, 1995
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- Changed software to fix intermittent timer variation problems.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.14	Date: Aug 18, 1995
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- Made batch times continually reload, unless a warning occurs, until they retain the same values as the eeprom.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.13	Date: May 23, 1995
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- Corrected the problem with the BPH button locking up the computer. The BPH button has no function.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.12	Date: May 10, 1995
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- Changed software so that if grain is present against the lo level rotary switch when the start button is pressed the dryer does not run through the AUX 1 timer.
- Dry timer stops if grain isn't against lower rotary switch, instead of continuing run, as usual.

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Grain Systems Incorporated -- Top Dry Software Steve Logue @ Grain Systems, Inc.	Version: 2.11	Date: March 10, 1995
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- Modified the software to have separate motor overload inputs for Fan 1 and Fan 2. The input for Fan #1 is J4-12, the Fan #2 input is J4-18. The warning message and the error history now reflect which fan had the motor overload problem.
- When the dryer is started with moisture control turned on it will now restart in dry mode with about 0.5 minutes remaining. This allows it to get back into "temperature hold" if needed.
- Found a bug that may have been preventing the "temp hold" message from being displayed.

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Grain Systems Incorporated -- Top Dry Software Tim McDonough @ Illini Technology, Inc.	Version: 2.10	Date: November 9, 1994
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- Changed the way the load systems are controlled. When the LOAD DELAY and the AUX 1 DELAY were set to different times, the second system never shut off until the dry cycle was complete. The second fill system now shuts off after running for the programmed amount of time as it should.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.09	Date: October 31, 1994
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- DRY CHAMBER LOW conditions are ignored for the time programmed into the AUX 1 TIMER after the dump chutes are opened just as they are when the dryer is first started. This prevents undesired shutdowns that may occur while the drying chamber is filling with grain in auto-batch systems.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.08	Date: October 10, 1994
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- Fixed a problem with the AUX 1 TIMER being incorrectly loaded with too large a value before it was counted down.
- If the dryer is stopped during temperature hold, it will remain in temperature hold when restarted.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.07	Date: October 4, 1994
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- Modified "wet supply empty" starting so that the "enter" switch must be pressed while the message is on screen for the dryer to start.
- The AUX 1 TIMER is being used to delay testing for DRY CHAMBER LOW conditions. When the dryer is filled the first time, the timer starts counting down the first time the DRY CHAMBER LOW switch is satisfied. From that point on, a DRY CHAMBER LOW signal will not shut down the dryer until the AUX 1 TIMER has expired. The default value for the timer is set to 1.0 minutes.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.06	Date: August 29, 1994
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Note: I believe all the problems we identified on August 17th have been corrected. I was not able to duplicate some of the more subtle things here on my simulator.

- Changed Load Auger operation as requested in Randy's fax of 8/10/94.
- Corrected problem that caused time and date to be messed up when entering the setup mode from the main dryer screen.
- When there's no grain in the dryer and the wet supply is empty the LCD displays a message indicating there's no grain to be dried when the user presses "start".
- If start is pressed when the wet supply is empty but the chamber_lo sensor is satisfied, the user is warned the wet supply is empty but is given the option of drying the remaining grain by pressing the "enter" switch on the keypad.
- Grain loading is inhibited during the last 25% of the batch dry cycle only when the load switch is in the "auto" position.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.05	Date: August 18, 1994
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- The display alignment mode now clears the run-time meter. This change is required due to a change in Illini's factory testing procedures.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.04	Date: August 8, 1994
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- Holding the Out of Grain switch while turning on the computer or pressing the increase and decrease keys at the same time now provides access to the setup screens including setting the date and time of the computer's clock.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.03	Date: July 20, 1994
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- Changed the way the load augers operate so that when the wet supply tank is emptied the system runs through the unload delay and then shuts down with a "wet supply empty" warning. This test is performed only when the load auger is running.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.02	Date: July 11, 1994
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- Corrected a problem with Auto-Batch systems that caused the main fans to cycle on and off during the unload cycle.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.01J	Date: May 11, 1994
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NOTE: 2.01J was shipped in the Auto-Flow systems going to England.

- Deja Vu! More fan logic tuning...

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Grain Systems Incorporated -- Top Dry Software	Version: 2.01I	Date: May 11, 1994
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- Continued work on logic for fan control, primary auger motor overload, secondary auger motor overload, and aeration fan motor overload.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.01H	Date: May 11, 1994
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- Altered fan starting logic to allow main fans to turn on when the aeration fan is in "auto", chamber low has not been satisfied, and the "start" switch has been pressed.
- Made changes to the burner processing logic required by the fan starting changes.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.01G	Date: May 10, 1994
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- Major revision to fan starting logic.
- Changed heater logic so the purge cycle is correctly stopped and restarted when the control switch is turned off and back on.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.01F	Date: May 9, 1994
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- Corrected problem with the errors for the Aeration Fan, Primary, and Secondary Fill system motor overloads.
- Added logic to the fan starting/processing procedures to prevent other fans from starting if the control switch for the aeration fan is not off and the aeration fan hasn't been started yet.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.01E	Date: May 9, 1994
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- If air switch testing is enabled and the switch opens while the fans are running, a "loss of airflow" error will be logged and the dryer will shut down.
- Changed the fan starting logic to allow the fans to start regardless of the state of the "chamber low" signal when the fan control switch is in the "on" position.
- I was unable to reproduce the following problems but am still working on trying to reproduce them and fix them:
 1. Aeration fan does not start first after the dryer shuts down due to a "dry chamber low" error. (RS 05/09/94)
 2. A fan motor overload error occurs when the stop button is pressed after a dryer shutdown occurs. (RS 05/09/94)
 3. Fill auger and aeration fan motor overloads are not working. (RS 05/09/94) NOTE: It may take the system 2-3 seconds to detect this condition because of the delay we had to add to allow the overload relays time to pull in when the system starts up and seizes control of the fill system from the user.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.01D	Date: May 6, 1994
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- When a warning occurs, the chutes are closed but may then be manually operated by the user.
- In Auto Flow units, the burners will purge and light during the unload cycle if needed.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.01C	Date: May 6, 1994
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- There are no longer separate control switches for each fan and heater. One switch controls both fans, another controls both heaters.
- Revised air switch testing logic to allow bypassing the air switch checking.
- Added logic to control high heat solenoids via an input signal at J3-20.
- Corrected problem with the Dry and Hold feature that prevented the dryer from properly restarting.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.01B	Date: May 5, 1994
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- Motor Overloads are not tested for 2 seconds after the contactor is energized. This provides a grace period for the external relay to get pulled in.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.01A	Date: May 5, 1994
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- Added separate "motor overload" error tests for fill, aux fill, and aeration fan motors.
- Aeration fan shuts off at the same time as the fill system when a problem occurs.
- Added logic for one air switch and a setup screen to allow disabling it.
- Corrected a problem that caused the fill system to briefly shut off if the start switch was pressed and the dryer was already running.
- Corrected the "dry chamber low" warning message typos.

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Grain Systems Incorporated -- Top Dry Software	Version: 2.01	Date: April 28, 1994
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- Added control switch inputs and safety checks for an aeration fan. When in "auto" this fan will start and run anytime the other fans run. The aeration fan starts first when its control switch is in the "on" or "auto" positions.
- Added logic to skip the cool cycle in Auto Flow systems. In addition to skipping this cycle, the cool timer count is blanked when an Auto Flow model is selected.
- Added logic to test for the chamber low sensor being uncovered once drying has started. If the dryer has been initially filled and the wet supply sensor says there is still grain available, the absence of a chamber low signal indicates there is a problem in the load auger system. When start is pressed the dryer loads grain (if needed) until the chamber low sensor is satisfied. Once it is satisfied the computer waits about five seconds and will then shut the dryer down if the chamber low signal goes away.
- Added logic to control both a primary (J8-08) and a secondary (J8-06) load auger. Both augers start any time the system calls for grain. Once the chamber high sensor is satisfied, both augers continue to run for the amount of time programmed into the "load delay". Once this delay has expired the primary auger shuts off and the secondary auger continues to run for the amount of time programmed into "aux 1 delay". The second auger has a separate "motor overload" test that is only used when the motor is supposed to be running.
- Added logic to test fan and burner "service" switches. If a component's service switch is opened, the computer will shut off a running component. Also, a component that is not running will not be started by the computer while the switch is opened.
- Added a "dry and hold" switch. When activated, the system will stop at the end of the cool cycle without dumping grain.
- Anytime the Top Dry system is processing grain, a relay connected to J8-01 will be energized to prevent the user from manually controlling an auger or loop system that supplies grain to the Top Dry equipped bin.

- Made changes to eliminate the thermostat having to cycle before the dryer will unload.
- Corrected a problem that prevented the TEMP HOLD message from being displayed when the dry cycle was extended due to low grain temperature.
- Corrected a problem that caused the model number of the type of dryer being controlled to be incorrectly retrieved from the NOVRAM when power was first applied.
- Corrected a problem that caused STORAGE CHAMBER FULL and WET SUPPLY errors to be logged without date stamps.

- Added the Message Editor feature to allow user programmed messages on the startup screen.
- Revised the way timers and electrical loads are controlled to improve the overall operation and reliability of the dryer.

- **Changed warning processing so that if a bin overflow condition occurs, the dump chute can still be operated to remove grain from the drying chamber.**
- The "hour meter" function now displays the total number of hours in hours and minutes, i.e.-- 00000:00. Pressing the INCREASE switch while the dryer is running will briefly display the hour meter so it can be checked while the system is running.

- Changed software so that the run-time meter only increments while the dryer is processing grain.
- **Changed software so that when the timer buttons are pressed to view the programmed time it does not reset the running timer. If the value is modified it will take effect on the next cycle that uses that timer.**
- Modified the load auger control software so that if the dryer is an "auto flow" system, the DRY CHAMBER HIGH input controls the auger regardless of whether the dry, cool, or unload cycle is in progress.
- Changed the load processing so that once a wet supply empty signal is received the load auger continues to run for the period set in the "load delay" to clean out the load auger.
- Added a counter that increments each time the chute dumps grain. The total accumulated counts can be seen in diagnostics mode (hold down the reset key for 5 seconds).

After the counts are displayed the user can optionally reset the counter to zero or leave it as it was.

- Corrected a problem that could sometimes cause the model to be changed if the increase or decrease switches are pressed while the start up initialization is in progress.
- An empty wet supply hopper indication now shuts the system down.

- All delays can now be programmed as high as 999.9 minutes. Formerly they could only be set to a maximum of 99.9 minutes.
- Software to support a "PLENUM HIGH TEMPERATURE" safety input has been added. The connection for this safety input is at input J1-11 on the Power I/O board.
- Software to support a "GRAIN TEMPERATURE HIGH LIMIT" safety input has been added. The connection for this safety input is at J5-05 on the Power I/O board.
- Program documentation now shows the "chute closed" signal at J1-19, its actual location.

- **The fill auger will not start until after a positive "chute closed" indication is sensed at input J1-11 on the power board.**
- There are now a total of four models to choose from in the setup mode. AB indicates an auto-batch system, AF indicates an auto-flow system. In an auto-batch system, the load auger is not allowed to run during the last 25% of the dry cycle.
- Corrected a problem that caused the fans to momentarily shut off when the dump chute opened if their control switches were set to the "on" position.
- The dump time is now adjustable in seconds. However, the "Batch Mode" display still shows the time in tenths of a minute as the system runs. If the dump time is set to less than 6 seconds, a time of ".0" will appear on the display.

- Revised software to eliminate tests for Plenum 1, Plenum 2, and MAXON valve warnings--these devices do not exist in the Top Dry units.
- The "Overflow Safety" now works on its own and does not require the "Chamber High Limit" to be satisfied to activate it.
- System timers, fans, and burners now start at the point the "Chamber Low Limit" is satisfied instead of when the "Start" switch is pressed.
- The LCD display now indicates whether the grain has reached the high and low chamber switches.

- Added inputs for manual control of dump chute. These switches are only active when the unit is not running in automatic mode.
- Relay RL4 is pulled in anytime there is AC power present in the system. If power is lost and the N.C. contacts open, the N.O. contacts are wired such that they close the dump chute which is DC powered and has a battery backup.

- Initial version of software used for GSI startup testing.