# GSI / Top Dry

## 2003

## Service School


a division of

THE GSI GROUP

# Contents

## Roof Damage Warning and Disclaimer


GSI DOES NOT WARRANT ANY ROOF DAMAGE CAUSED BY EXCESSIVE VACUUM OR INTERNAL PRESSURE FROM FANS OR OTHER AIR MOVING SYSTEMS. ADEQUATE VENTILATION AND/OR "MAKEUP AIR" DEVICES SHOULD BE PROVIDED FOR ALL POWERED AIR HANDLING SYSTEMS. GSI DOES NOT RECOMMEND THE USE OF DOWNWARD FLOW SYSTEMS (SUCTION). SEVERE ROOF DAMAGE CAN RESULT FROM ANY BLOCKAGE OF AIR PASSAGES. RUNNING FANS DURING HIGH HUMIDITY/COLD WEATHER CONDITIONS CAN CAUSE AIR EXHAUST OR INTAKE PORTS TO FREEZE.

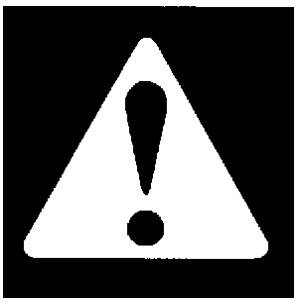
## Operating Instructions

The principal concern of the GSI Group, Inc. ("GSI") is your safety and the safety of others associated with grain handling equipment. This manual is written to help you understand safe operating procedures, and some of the problems that may be encountered by the operator or other personnel.

As owner and/or operator, it is your responsibility to know what requirements, hazards and precautions exist, and to inform all personnel associated with the equipment, or who are in the fan area. Avoid any alterations to the equipment. Such alterations may produce a very dangerous situation, where serious injury or death may occur.

## Safety Alert Symbol

The symbol shown is used to call your attention to instructions concerning your personal safety. Watch for this symbol; it points out important safety precautions. It means "ATTENTION", "WARNING", "CAUTION", and "DANGER". Read the message and be cautious to the possibility of personal injury or death.



**WARNING! BE ALERT!**
Personnel operating or working around electric fans should read this manual. This manual must be delivered with the equipment to its owner. Failure to read this manual and its safety instructions is a misuse of the equipment.

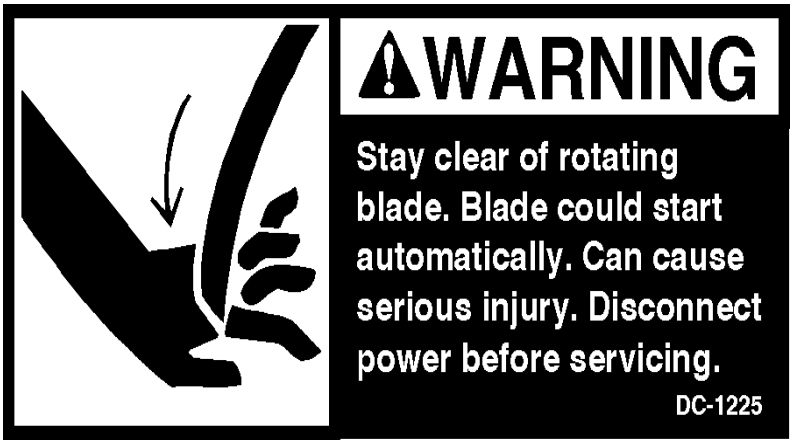
**Grain Systems, Inc. recommends contacting your local power company, and having a representative survey your installation so the wiring is compatible with their system, and adequate power is supplied to your unit.**

Safety decals should be read and understood by all people in the grain handling area. The rotating blade, fire warning decals and voltage danger decal must be displayed on the fan can. The bottom right decal should be present on the inside bin door cover of the two ring door, 24" porthole door cover and the roof manway cover.

If a decal is damaged or is missing contact:

Grain Systems, Inc.
1004 E. Illinois St.
Assumption, IL 62510
217-226-4421

A free replacement will be sent to you.






**READ THESE INSTRUCTIONS**
**BEFORE OPERATION AND SERVICE**
**SAVE FOR FUTURE REFERENCE**

1. Read and understand the operating manual before trying to operate the dryer.

2. Power supply should be OFF for service of electrical components. Use CAUTION in checking voltage or other procedures requiring power to be ON.

3. Check for gas leaks at all gas pipe connections. If any leaks are detected, do not operate the dryer. Shut down and repair before further operation.

4. Never attempt to operate the dryer by jumping or otherwise bypassing any safety devices on the unit.

5. Set pressure regulator to avoid excessive gas pressure applied to burner during ignition and when burner is in operation. Do not exceed maximum recommended drying temperature.

6. Keep the dryer clean. Do not allow fine material to accumulate in the plenum or drying chamber.

7. Use CAUTION in working around high speed fans, gas burners, augers and auxiliary conveyors which START AUTOMATICALLY.

8. Do not operate in any area where combustible material will be drawn into the fan.

9. Before attempting to remove and reinstall any propellor, make certain to read the recommended procedure listed within the servicing section of the manual.

10. Clean grain is easier to dry. Fine material increases resistance to airflow and requires removal of extra moisture.

**This product is intended for the use of grain handling only. Any other use is considered a misuse of the product.**
**Some edges of the product components can be sharp. It is recommended that each component of this product be examined to determine if there are any safety considerations to be taken. Any and all necessary personal protective equipment should be worn at all tines when handling, assembling, installing and operation of the product and/or components.**
**Guards are removed for illustration purpose only. All guardsmust be**

## Use Caution in the Operation of this Equipment

The design and manufacture of this dryer is directed toward operator safety. However, the very nature of a grain dryer having a gas burner, high voltage electrical equipment and high speed rotating parts, does present a hazard to personnel, which can not be completely safeguarded against, without interfering with efficient operation and reasonable access to components.
Use extreme caution in working around high speed fans, gas-fired heaters, augers and auxiliary conveyors, which may start without warning when the dryer is operating on automatic control.

KEEP THE DRYER CLEAN
DO NOT ALLOW FINE
MATERIAL TO ACCUMULATE
IN THE PLENUM CHAMBER
OR SURROUNDING THE OUT-
SIDE OF THE DRYER

Continued safe, dependable operation of automatic equipment depends, to a great degree, upon the owner. For a safe and dependable drying system, follow the recommendations within this manual, and make it a practice to regularly inspect the operation of the unit for any developing problems or unsafe conditions. Take special note of the safety precautions listed above before attempting to operate the dryer.

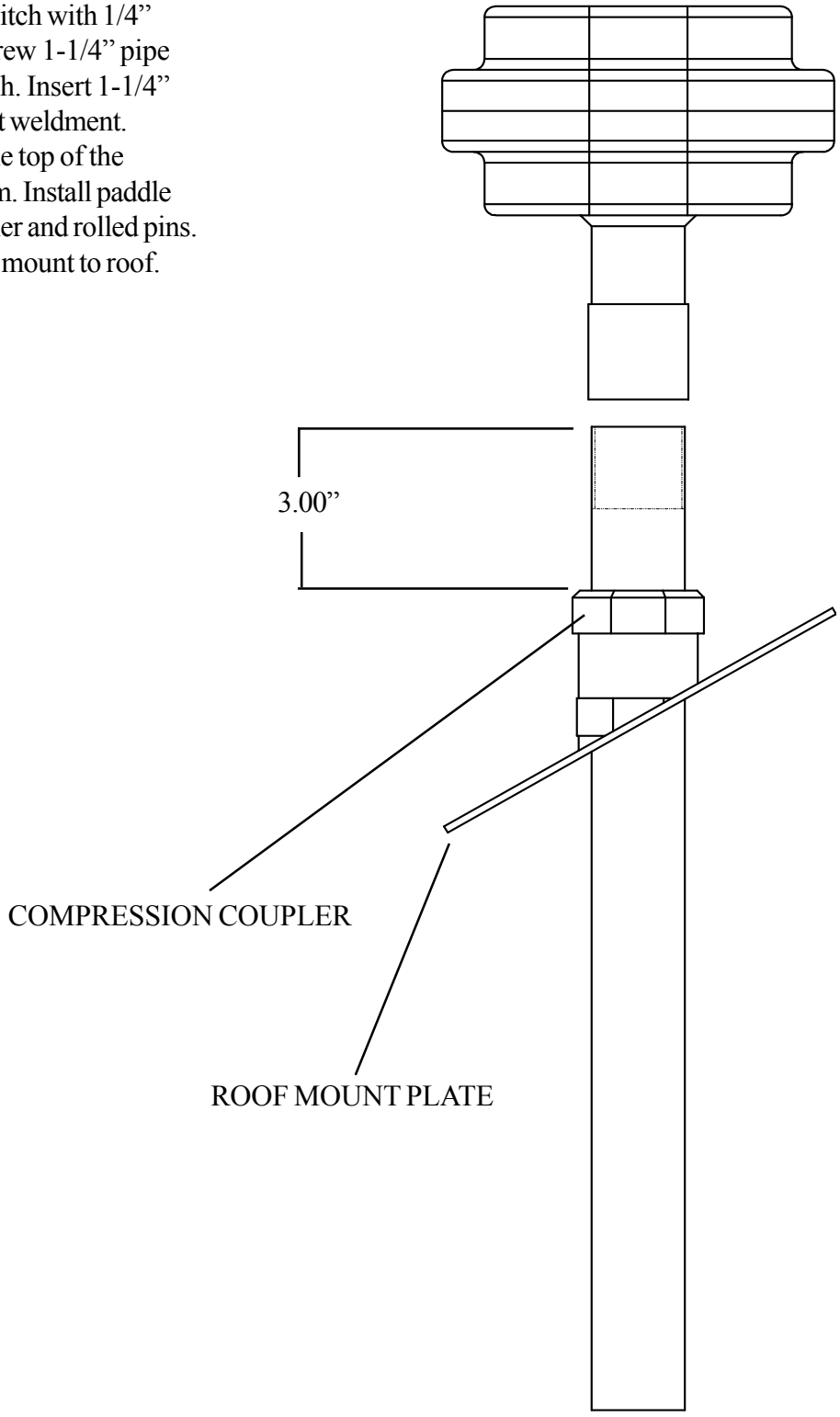
# GSI / Top Dry

# Product Updates

* **Adjustable Drying Chamber High Level Rotary Switch**
* **Plenum Hi-Limit**
* **Software Updates**

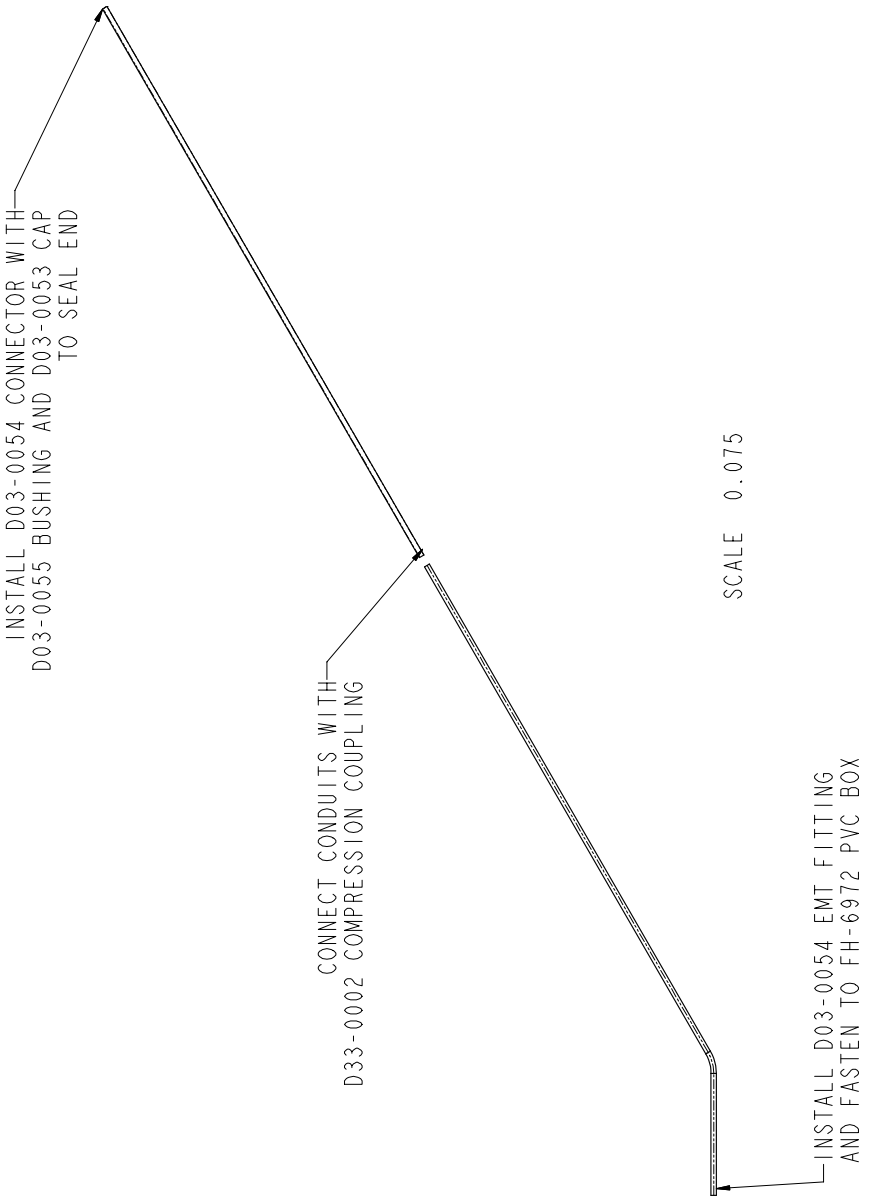
# DRYING CHAMBER HILIMIT ROTARY SWITCH INSTALLATION

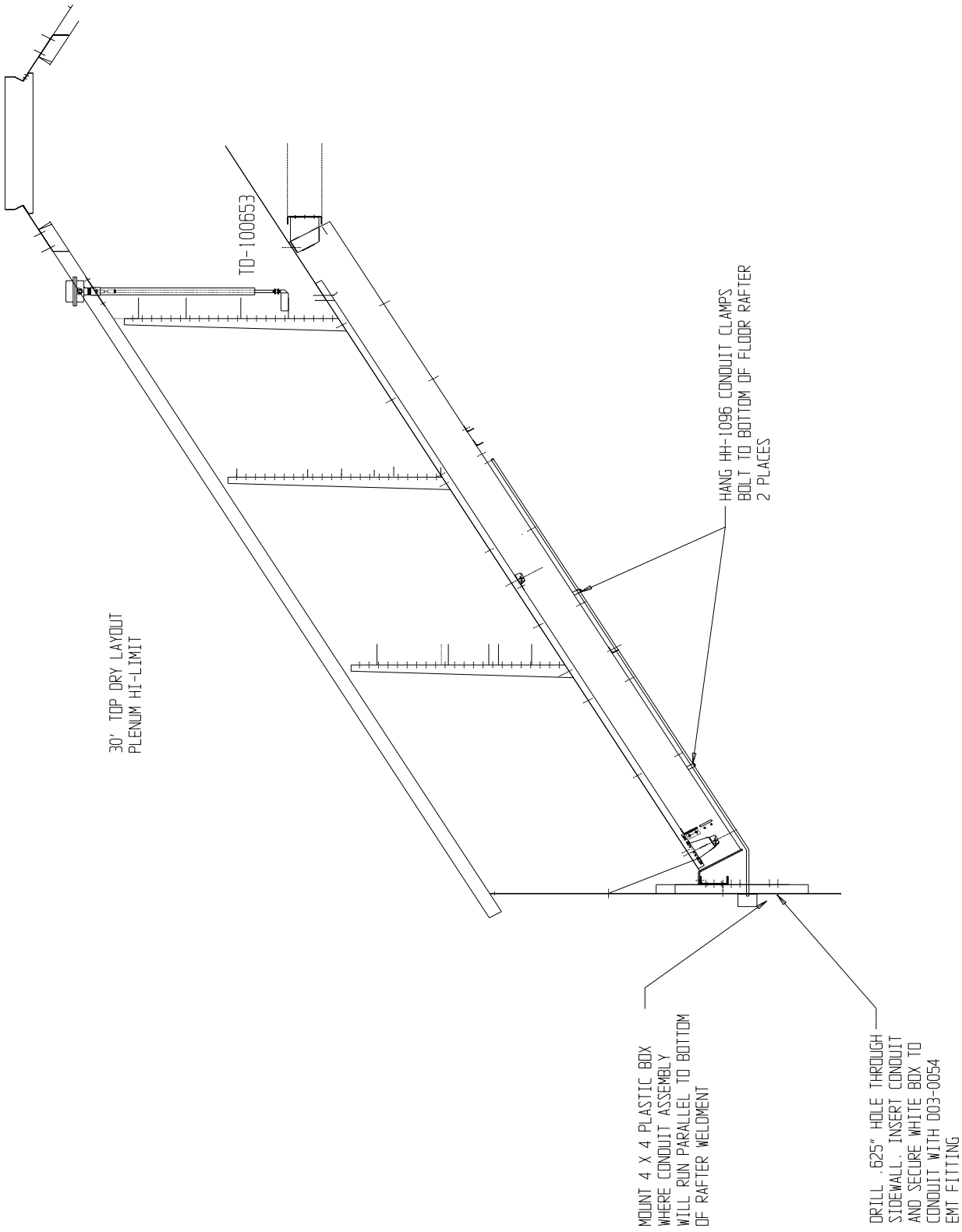
Assemble 1/4" shaft to rotary switch with 1/4" coupler and rolled pins. Next Screw 1-1/4" pipe coupler to bottom of rotary switch. Insert 1-1/4" pip through adjustable roof mount weldment. Leave 1-1/4" pipe sticking out the top of the weldment 3" as shown in Diagram. Install paddle to 1/4" shaft assembly with coupler and rolled pins. Switch assembly is now ready to mount to roof.



## TOP DRY PLENUM HI LIMIT INSTALLATION

1. Assemble two pieces of conduit together with coupler.
2. Mount conduit clamps to conduit assembly.
3. Locate conduit assembly on the bottom of a rafter at least 2 feet to one side of the fan entrance. Do not install between two fan entrances.
4. Mark bin wall where conduit will pass through and drill a hole just large enough to allow the conduit to pass through. Seal this with caulking when complete.
5. Install white PVC box assembly on outside of bin wall.
6. Insert 10’ capillary into conduit assembly.
7. Connect SJO cord to hi limit and connect wires to terminals 20 and 21 on the master fan terminal strip. These terminals are J7-08, and J7-03.




TD-100653
30' TOP DRY LAYOUT
PLENUM HI-LIMIT
HANG HH-1096 CONDUIT CLAMPS
BOLT TO BOTTOM OF FLOOR RAFTER
2 PLACES
MOUNT 4 X 4 PLASTIC BOX
WHERE CONDUIT ASSEMBLY
WILL RUN PARALLEL TO BOTTOM
OF RAFTER WELDMENT
DRILL .625" HOLE THROUGH
SIDEWALL. INSERT CONDUIT
AND SECURE WHITE BOX TO
CONDUIT WITH 003-0054
EMT FITTING

# GSI / Top Dry

# Software Revisions

## Network Autoflow Display Board Software Revisions

**********

VERSION: 2.15 REVISED BY: Steve Logue RELEASE DATE: Oct 17, 2002

NOTE: This Version does NOT support Watchdog and the Heater Version MUST be 1.09. HEATER VERS – 1.09 IO VERS – 1.07

1) The "FAN DELAY" is now called "MOTOR DELAY".
2) Added a way for GSI to reset total hours.
3) Here is a list of switches/features which can be found under the setup screens accessed via holding in on MODIFY while powering on the Control Power.

Below is a description for each defining what it means to disable/enable them:

i) **AIRSWITCH** -> Enabled means you will get a shutdown when a fan loses airflow. Disabled will satisfy the dryer's airflow requirements for the burner regardless of the actual air switch state.

ii) **LOW LEVEL SWITCH** -> Enabled means the drying chamber low level switch will act as normal, i.e, will indicate the real state of the rotary switch. When disabled the dryer will think the low level switch is always covered.

iii) **WET TANK SWITCH** -> Enabled means this switch will act as normal. Disabled means the dryer will think this switch is always covered with grain.

iv) **START FANS WITH** HIGH -> Enabled means the dryer will start fans according to state of drying chamber hi level switch. Disabled means dryer will start according to drying chamber low level switch.

v) **AERATION FAN BYPASS** -> Enabled means the BYPASS is active, which allows the aeration fan to continue to run after a dryer shutdown.

4) The REFILL TIMER and the TIME UNTIL LOAD OFF screens are only shown when the dryer is set for Autobatch mode.
5) There are two more settings available under the "Power on and Modify key in" sequence for the user to set how many degrees a measured temperature can exceed a setpoint without causing an overheat. The user can set 10 -> 50 degrees above the setpoint to be an overheat condition. The default for the plenum temp is 20F and the default for the grain temp is 30F.
6) The low level rotary switch function is the same as it was in 2.14, but now instead of giving a warning which states "DRY CHAMBER EMPTY" when it becomes uncovered it gives "LOW LEVEL SW EXPOSED."
7) Added an Out of Grain Timer. The time value can be changed under the setup button. This timer starts whenever either fill systems is running and the load switch is in the auto position. The timer is reset when both load augers stop. If the timer runs out of time an OUT OF GRAIN warning is issued. The default is 20 minutes. Any time the value of this Timer is changed the new value takes effect immediately.
8) Changed warning for wet bin empty to state "WET BIN SW EXPOSED" instead of saying "DRYER OUT OF GRAIN".
9) Renamed "FILL 1 DELAY" to "FILL SYSTEM #1". Changed name of "FILL 2 DELAY" to "HI LEVEL SW". The HI LEVEL SW delay is always available on both one and two fill system dryers and is used to make sure the dryer is full so you don't get bogus shutdowns. The FILL SYSTEM #1 delay is only available when you are set for two fill systems and it is used to establish auger cleanout time.
10) If the Storage Bin High Limit is detected as failed (the N.C. pin and the N.O. pin from the switch are both reporting the same voltage, 0 or 12 volts) a warning is reported as "BIN HI LIMIT SW BAD".
11) If wet supply rotary switch becomes uncovered there is a timer which must expire before a warning is given. This timer/delay was called "AUX 1 DELAY", but is now termed "WET BIN SW. delay" It is found under the DELAYS key.
12) The time a user has to think about making a change to a timer/setpoint before it automatically proceeds to the next selection screen has been doubled.
13) Changed the name of delay/timer "LOW LEVEL TIMER" to "LO LEVEL SWITCH."
14) Enabled the "START FANS WITH HIGH" switch function. There was previously a screen available to select this function, but it was never active.
15) The cool down timer is now set to the reload value of the cool timer whenever any one of the four following shutdowns takes place:
    i) Dry and Hold switch is turned to on state.
    ii) Grain falls away from wet bin supply switch.
    iii) Storage chamber is full.
    iv) Dryer is out of grain.
16) Fans Off Delay now defaults to 0 minutes instead of 1 minute and has an upper limit of 5 minutes. This delay can be found under the "delay" key.
17) The dryer functions the same whether the load switch is in auto or on, but the out of grain timer only times down while the load switch is in the auto position and one of the load augers is running.

**********

VERSION: 2.14 REVISED BY: Steve Logue RELEASE DATE: Sept 20, 2002

NOTE: This Version does NOT support Watchdog and the Heater Version MUST be 1.09 not the Watchdog version 1.10.

1) Fixed software so the burner differential could be set to one degree and it would remain there after loss of power.

**********

VERSION: 2.11 REVISED BY: Steve Logue RELEASE DATE: October 27, 2000

1) Burner differential would not stay at 1 deg F when the dryer was turn off, using 2.10, now it does.
2) When grain reaches the Storage Chamber Rotary Switch, the dryer will enter a "Cool Down Mode". The fan will run and cool thegrain for 10 minutes before shutting down due to a Storage Chamber Full error.
3) When grain falls away from the Wet Supply Rotary Switch, the dryer will enter a "Cool Down Mode" after the fill system shut off. The fan will run and cool the grain for 10 minutes before shutting down due to a No Wet Supply error.
4) When the Dry & Hold switch is placed in the "On" position the dryer will enter a "Cool Down Mode" for 20 minutes before stopping. This only happens at the end of the dry cycle.
5) Corrected a problem with the Fans Off Delay. If there is time on this delay, the fans and heaters will shut off during the unload cycle, after the unload cycle is complete the delay counts down. The fans and heaters will not start again until the delay has reached zero.
6) Corrected a problem with the Time Until Load Off percentage set in the set-up mode. Now, in Auto batch only, the Fill Systems will shut off if grain has not reached the dry chamber high level rotary switch within the set percentage of the dry timer is completed. Example: 1 hr dry time, 50% Time Until Load off.
The fill systems will shut off regardless of rotary switch status after 30min has expired.
7) Corrected a problem with the Refill Delay. Now, in Auto batch Only. The Refill Delay begins to count down after the unload cycle is completed. If grain has not reached the drying chamber low level rotary switch before this delay reaches zero, a dry chamber empty error is given.

**********

VERSION: 2.10 REVISED BY: Steve Logue RELEASE DATE: Sept 11, 2000

1) Changed the Minimum Burner Differential to 1 Deg Fahrenheit
2) Fixed the problem where the burner was not shutting off when the Dry & Hold switch was placed in the "On" position, the Dry Cycle was complete, and the Dryer was in the Cool Cycle. Now, when the Dry & Hold switch is placed in the "On" position, and the Dry Cycle is complete, the dryer will shut the burner off and will cool for the amount of time on the Cool Timer before stopping.
3) Fixed a problem where the dryer was not shutting down with an "Out of Grain" error when the Wet Supply Rotary Switch was exposed. Now when the Wet Supply Rotary Switch is exposed, the Fill #1, and Fill #2 delay will count down and shut off Fill System #1 & #2, then the dryer will shut down with an "Out of Grain" error. If there is still grain against the Low Level Rotary Switch, the dryer can be restarted by pressing the Stop switch to clear the error, turning the Load Auger switch to the "Off" position, and pressing the Start switch. When the Start switch is pressed the screen will say "Press <Enter> to Dry Remaining Grain". If the <enter> button is pressed the dryer will restart. NOTE: If the Load Auger switch is left in the "Auto" position an "Out of Grain" error will be given on startup.

# Heater and Batch Top Dry Revisions

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0.30 Released OCTOBER 23, 1998
---
1) FLAME TIME OUT IS NOW 10 SECONDS. THE IGNITOR SHUTS OFF IN ABOUT 7.5 SECONDS.

0.29 Released OCTOBER 22, 1998
---
1) ELIMINATE THE DEISEL OPTION -- FORCE THAT FLAG TO ALWAYS BE RESET. THIS CAUSED A 36 SECOND FLAG TIME OUT WHICH THE HARDWARE IS NOT SETUP TO ACCEPT. IF DEISEL OPTION IS REQUIRED AT SOME LATER DATE -- WILL HAVE TO MODIFY SOFTWARE TO REDUCE FLAME TIME OUT BACK TO 12 SECONDS MAX OR CHANGE THE HARDWARE.
2) DEFAULT FAN DELAY = 0 SECONDS ( FOR SLAVES )

0.28 Released August 24, 1998
---
1) CREATE O / noO FLAG -- FOR EITHER IGNITOR OR HOT SURFACE IGNITION -- WHEN SET THIS IS USED FOR A HOT SURFACE IGNITION SYSTEM -- SO THAT AT THE END OF THE PURGE DELAY THE IGNITOR COMES ON FOR 5 SECONDS BEFORE THE GAS VALVE TURNS ON. NOTE: I DID NOT USE I / noI BECAUSE IF THIS SOFTWARE WAS PUT ON AN OLD DRYER -- IT WOULD DEFAULT TO noI -- IF THEY DID NOTHING. SINCE H / noH IS ALREADY BEING USED FOR HUMIDITY -- I JUST USED O.
2) WHEN THE " O " FLAG IS SET -- AFTER THE 9 SECOND IGNITOR PERIOD THE IGNITOR DOES NOT TURN OFF
3) IN THE " O " MODE A FLAME OUT CAUSE THE GAS VALVES TO GO OFF FOR 5 SECONDS WHILE THE HOT SUFACE INGITION COMES ON. THE WAY I DID THIS WAS TO RESET THE PURGE TIMER TO 5 SECONDS -- SO ON THE DISPLAY THE " PURGE " COMES UP -- THIS WAS THE EASIEST WAY TO ACCOMPLISH THIS.
4) CREATE d / nod FLAG -- FOR DIESEL FIRED SYSTEM. THIS SYSTEM HAS NO PURGE DELAY ( ACTUALLY 1 SECOND PURGE ) AND A 36 SECOND FLAME OUT TIME.
??????????????????????????????????????????
SHOULD THERE BE A LITTLE MORE PURGE DELAY --- SAY 5 SECONDS INCASE SOMEONE ACCIDENTLY SET THE WRONG FLAG.
5) IF THE OPERATOR SET BOT THE " O " AND " d " FLAG THE " d " FLAG WILL NOT SET.

0.27 Released August 22, 1998
---
1) Fixed problem in the Non Top Dry where after 30 minutes Error 3 shut the dryer down.

0.26 Released April 29, 1998
---
1) CHANGE FLAME OUT TIME TO 12 SECONDS -- IGNITOR SHUTS OFF IN 9 SECONDS -- 3 SECONDS LATER IF NO FLAME -- SHUT DOWN -- NO FLAME. (CHANGED IN .30)
2) INCLUDE " FLAME " SYMBOL IN THE AMBIENT TEMPERATURE AND HUMIDITY MODES
3) ALLOW HUMIDITY DIFFERENTIAL TO BE SET TO 2 %
4) DON'T DESTROY " MODE " REGISTER WHEN EXITING THE PROGRAM MODE

0.25 Released April 27, 1998
---
1) Add a mode select for the humidity and ambient temperature. Using the mode switch ( Fan bypass ).

C.24 ??????????????????????

C.23 Released OCTOBER 29, 1997
---
1) FIXED PROBLEM WHERE IF BOTH THE MASTER AND SLAVE HAVE THEIR OWN INDEPENDENT ERRORS -- THE SLAVE DOES NOT FLICKER
BACK AND FORTH BETWEEN IT ERROR AND THE MASTER ERROR -- SLAVES ERROR HAS PRIORITY ON THE SLAVE UNIT AND THE MASTER HAS PRIORITY ON MASTER UNIT.
2) IF THERE IS AN INCONSISTANCY BETWEEN MASTER AND SLAVE ( ERROR 9, 10 OR 11 ) -- THE MASTER TRIES RESENDING THE IGNITOR COMMANDS 50 TIMES AND RECHECKING BEFORE ISSUING THE ERROR

b.23 Released OCTOBER 22, 1997
---
1) EXTEND THE IGNITOR ON TIME TO 14 SECONDS AND THE LAST 4 SECONDS SHUT THE IGNITOR OFF (changed in .26)

A.23 Released OCTOBER 15, 1997
---
1) ALLOW 20 SECONDS FOR ILLEGAL FLAME SENSE

SECONDS -- EXIT THE PROGRAM MODE.

0.22 Released OCTOBER 22, 1996
---
1) FIXED THE PROBLEM WHERE IF YOU SET IN 3.2 HOURS -- THE HOURS IMMEDIATELY WENT TO .32 WHEN YOU EXITED THE PROGRAM
MODE
2) *CLEARING OF THE NOVRAM IS NOW ACCOMPLISHED BY POWERING UP WITH THE PROGRAM SWITCH HELD DOWN ( LOWER LEFT *
*SWITCH ) -- WHEN THE " 0 " COMES UP -- ENTER A " 7 " WITH THE INCREMENT SWITCH -- THEN PUSH THE PROGRAM SWITCH AGAIN *
*" - - - " COMES UP -- YOU HAVE 2 SECONDS TO DEPRESS THE INC DEC SWITCHES AT THE SAME TIME TO CLEAR THE NOVRAM *

0.21 Released OCTOBER 2, 1996
---
1) FIXED THE PROBLEM THAT I CREATED IN VERSION # 0.20 WHERE THE ERROR 3 CAME ON -- SPARE TEMPERATURE OPEN
2) WHEN IN TOP DRY MODE THE CYCLE FLAG IS ALWAYS SET

0.20 Released SEPTEMBER 12, 1996
---
1) CREATE A NEW MODE THAT WILL MAKE IT SO THAT BOTH THE GRAIN TEMPERATURE MUST EXCEED THE LIMIT AND THE DRY TIME
MUST BE EXCEEDED BEFORE ADVANCING TO THE COOL CYCLE ON THE TOP DRY
2) IF THE GRAIN TEMPERATURE GETS TO 200 -- ALWAYS ADVANCE TO THE COOL CYCLE -- IN ALL MODES OF TOP DRY, ---> IF THE 10
MINUTE GRAIN TIMER HAS GONE TO 0.
3) FIXED PROBLEM ( I THINK ) WHERE THE TEMPERATURE WOULD MOMENTARILY JUMP UP TO 275 DEGREES -- WHEN THE THERMISTOR
SWITCH-OVER OCCURED ON THE BOARD

0.19 Released JUNE 8, 1996
---
1) HUMIDITY SOFTWARE

0.18 Released MARCH 13, 1996
---
1) DON'T ADVANCE TO COOL CYCLE IN TOP DRY MODE FOR 10 MINUTES AFTER STARTING THE DRYER
-- ALLOW THE GRAIN TEMPERATURE SENSOR TO STABILIZE
2) WHEN THE SLAVE POWERS UP WITH THE FAN ON -- THERE WAS A LOT OF DISPLAY FLICKER -- CORRECT THAT PROBLEM

0.17 Released OCTOBER 17, 1995
---
1) FIXED THE PROBLEM WITH THE TOP DRY MASTER NOT SHUTTING THE FAN OFF WHEN THE SLAVE GOT AN ERROR
2) WHEN GETTING ONE OF THE LIMIT ERRORS, ETC -- THAT JUST DISPLAYS A LEGEND -- ON THE MAIN DISPLAY INSTEAD OF DISPLAYING
TEMPERATURE -- DISPLAY: 0 0 0
ERROR

0.16 Released OCTOBER 16, 1995
---
1) Raised the Error 12 Voltage Limit from >155 to >195 volts for 120 volt systems. <155 volts still the error 12 limit for 240 volt systems.

0.15 Released OCTOBER 14, 1995
---
1) CORRECTED THE PROBLEM WHERE WITH CERTAIN ERRORS YOU COULD NOT VIEW THE AMOUNT OF TIME THE DRYER HAS BEEN
DOWN DUE TO ERROR CONDITION
2) IF THE " STANDARD DRYER " ( NOT TOP DRY ) FINDS A SLAVE INCONSISTANCY ERROR -- ERROR # 9, 10 O 11 -- IT WILL TRY RESTARTING
THE SLAVE FOR 5 SECONDS BEFORE IT GIVES UP
3) CORRECTED THE BUG IN VERSION 14 SOFTWARE WHERE THE REMAINING HOURS WERE NOT STORED FOR DRY AND COOL TIME -- ALL

CAN VIEW THE HOURS THAT HAVE PASSES SINCE THE SHUT DOWN BEGAN. MAX NUMBER OF HOURS = 218 HOURS ( 9.1 DAYS ) *
2) ADDED ERROR NUMBER 13 ==>> + 11 LIMIT SHORTED
3) LIMIT MAX TEMPERATURE SETTING TO 230

0.11 Released AUGUST 16, 1995
---
1) MAKE THE SPARE RELAY ACT THE SAME AS THE FAN RELAY -- BOTH OPEN AND CLOSE AT THE SAME TIME

0.10 Released July 12, 1995
---
1) If the Heater shuts down due to a " Illegal Flame " Sensing problem – Flame on when no gas valves are on →Error 7. Leave the Fan on till that problem goes away. When the Heater Control detect No Flame – The Fans are Shut Down.

The Fans are left in the State they were in when the error was detected. That is – If the Error 7 occurs on the Power Up – Don't turn the Fans on – That must be due to some other problem.

In a Master / Slave heater – Only the Heater with the Flame since problem keeps it's fan on.

In the Timed Shut Down Modes the Fans are left on till it is confirmed that the Flame has gone away. This is for Top Dry and Regular Fan and Heater.

In the Top Dry when the Grain Temperature excedes the limit – The Fans are left on till it is confirmed that the Flame has gone away.

0.09 Released May 27, 1995
---
1) In all test modes shut the outputs off.
2) ON May 31, 1995 -- changed the flash decode bytes to program the entire chip rather than the first 256 k bits -- left the version at 0.09

0.08 Released April 18, 1995
---
1) Fixed the problem where when the humidity was too high or the grain temp was to high the display flash real fast.

# GSI / Top Dry

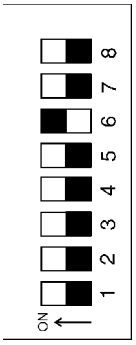
# Series 2000 Batch Errors and troubleshooting

* Dipswitch Settings
* Error Messages and solutions
* Operation TIps
* Common Problems

## Configuration Dip Switches (Normally Done At Gsi)

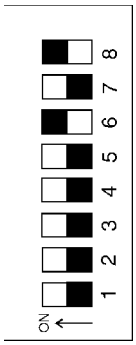
These switches are used to configure the heater control for various types of heaters.

Multiple heaters connected together through the serial link.




Top Dry stand alone with **no** remote display at the bottom-dip switch 6 on/all others off.


Top Dry master with a remote display at the bottom-dip switch 6 & 7 on/all others off.



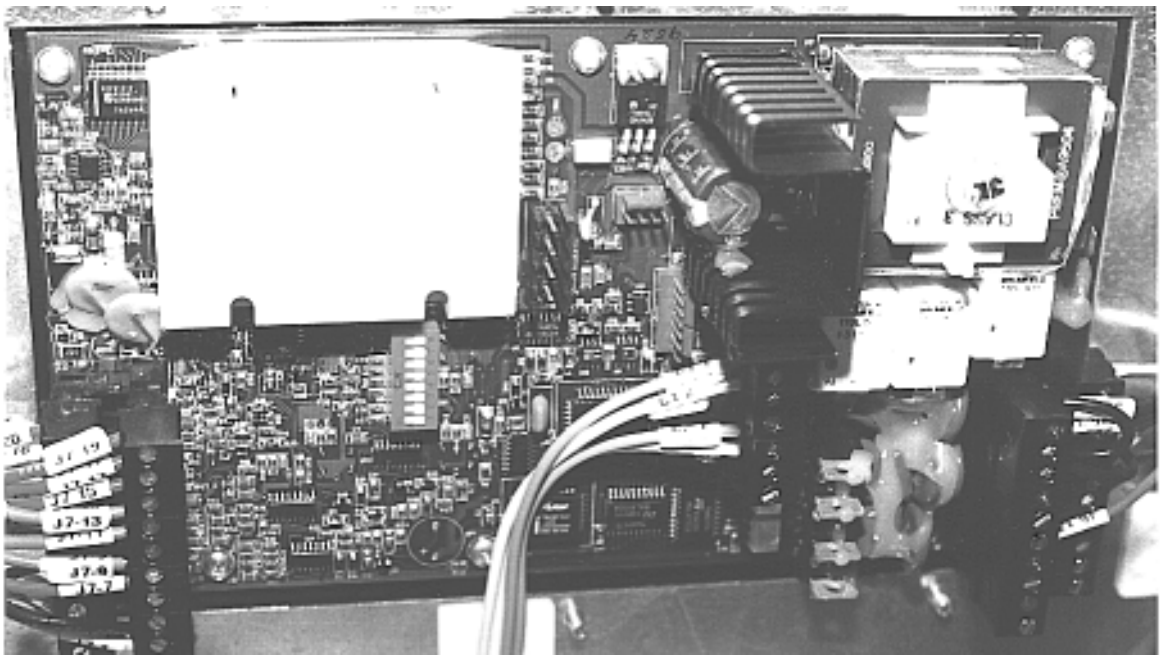

Top Dry master with a remote display at the bottom and one slave fan heater-dip switch 6 & 8 on/all others off.


Top Dry master with a remote display at the bottom and 2 slave fan heater-dip switch 6, 7 & 8 on/all others off.


Top Dry remote display at the bottom-dip switch 1 & 6 on/all others off.


Top Dry 2nd fan heater-dip switch 2 & 6 on/all others off.


Top Dry 3rd fan heater-dip switch 1, 2 & 6 on/all others off.



**The backside of the control board, showing the dip switch placement.**

## Limit Switches

The following limit switch errors light up individually on the heaters LCD screen:

PLENUM, HOUSING, VAPOR, TEMP HI LIMIT

## Multiple Heater Error Conditions

Two or more heaters may be connected together through the serial link. If the master cannot communicate with a slave controller, the master will display "SLA" on the main display and the "RX" "TX" symbols will be flashing. ***If a limit switch error or one of the error numbers 1 through 8 occurs, that error is displayed on the slave where the error originates. The master displays "SLA ERROR".***

## MISC ERROR NUMBERS

**1**

Plenum temperature probe 1 open

**2**

Plenum temperature probe 1 short

**3**

Grain temperature probe 2 open

**4**

Grain temperature probe 2 short

**5**

Airflow open

**6**

Airflow short

**7**

Illegal flame sense

Error 7 is most likely caused by stuck open solenoid. Error 7 will not shut down fan until loss of flame is detected by control.

**8**

Flame probe short error

**9**

Slave #1 inconsistent with master with either the drying grain flag or the LP main solenoid or cycle solenoid- most likely the slave got reset powering up with the solenoids off

**10**

Slave #2 inconsistent same as error 9 for slave #1

**11**

Slave #3 inconsistent same as error 9 for slave #1

**12**

Wrong voltage. Dip switch #5 is the voltage selector switch. If dip switch #5 in "ON" that selects 240 VAC. If the unit has only 120 VAC applied, error 12 will show up. If dip switch #5 is"OFF" that selects 120 VAC. If the unit has 240 VAC applied error 12 will show up.

This is important because if the fan heater is set up at GSI for 120 VAC and the customer connects to 240 VAC the heater control will work, but if allowed to operate the solenoids will have 240 VAC applied to them which will damage solenoids.

(Errors 9 through 11 are displayed only if multiple heaters are tied together through serial link).

Note: *Temperature sensor connection*-the temperature sensor (bolt) must always be connected to the master. In the case of the Top Dry, both temperature sensors must be connected to the master (unit at the top). Top Dry grain temperature input is connected to J7 pins 14 and 18.

# Error Details

Error #1 Plenum Temperature Probe Open. The two wires for checking this error are on terminals 24 and 25 they are labeled J7-12 and J7-13. The wires must be removed from the terminals to receive a correct reading. This must be checked with a Ohm Meter. If the probe is open you will not receive any reading on your meter because there is no continuity between the wires. It is like you cut the wire in half. If there is resistance there is a certain resistance reading for current temperature of the probe. See Chart at the back of this section to verify that the sensor is correct. If the sensor is correct you probably did not have a good connection from one of your wires to the terminal strip.

Error #2 Plenum Temperature Probe Short. This error is indicating that the Plenum Temperature probe is shorted. This will also need to be check with a Ohm meter and if it is shorted will read no resistance as if you were checking both ends of one wire. Remember to disconnect the wires before checking.

Error #3 Grain Temperature Probe Open. This error is indicating the Grain Temperature Probe located in the drying chamber on a leleveleveling band is shorted.. The terminals for checking the Grain Temperature Probe are 22 and 23 and are labeled J7-14 and J7-18. The process for checking this error are the same as in error #1. Remember to disconnect the wires from these terminals before checking them.

Error #4 Grain Temperature Probe Short. This error is indicating that the Grain Temperature Probe is shorted. This is the same Probe as in error #3 and is checked like Error #2.

Error #5 Airflow Open. This error is indicating the airflow proving switch is in its open state and should be closed verifying there is no airflow so the fan heater will start. This must be checked with a Ohm meter and can be done directly on the airswitch terminals labeled N.O. And Common. This can also be checked on the terminal strip between terminals 12 and 14. They are labeled J7-09 and J7-10. The Airswitch can usually be adjusted and correct this error.

Error #6 Airflow Short. This error is indicating that the airswitch is stuck in both a normally open and normally closed state and needs to be adjusted, cleaned, or replaced.

Error #7 Illegal Flame Sense. This error is indicating that there was a flame sensed at a time it should not have. This is usually caused by a solenoid valve not closing properly. You can detect a solenoid not closing properly by watching the pressure gauge on the gas train. After the unit cycles off the pressure gauge will not drop immediately, it will gradually drop to zero or you can witch the flame and see if it is shutting off immediately or gradually burning out.

Error #8 Flame Probe Short. When this Error is given it can be either the flame probe is touching a metal surface or The flame probe wire has shorted to ground somewhere. To fix adjust the probe or replace the wire to the to of it.

**SERIES 2000 BATCH TOPDRY TIPS**

**Operation Tips for Top Dry Batch**

**Special Wire Terminals**

**J7-10 or J7-13** on stand alone unit - 12 volt Ground for use with a tester.
Any unused third terminal on any network connector is also a 12 volt ground.

1. When ever you see 000 on the Screen there is an Error some where on the screen.

2. To Force a new time setting while the Dryer is running Push the "Inc" (Up Arrow) and the "Dec" (Down Arrow) keys at the same time

3. To change the Second Fan Start delay hold down the "Program Dry/Cool Timers" and "Program Temperature" keys and turn on the power switch. Note this must be done on the Master Fan and cannot be done of the Slave Fan or at the Remote Display.

4. Turning Dip Switch 3 ON disables the Air Flow monitoring function for testing. Remember to turn OFF before leaving the Dryer as loss of airflow will not shut down the dryer if the switch is left on.

5. You can select two modes for when the Drying Process stops.

   A. Standard setting which will shut down if either Grain Temperature OR Dry Time is met.
   B. Optional setting in which both Grain Temperature AND Dry Time must be met.

   To change this setting use the following steps.

   1. While holding the Program Key in turn Power switch on.
      The Screen should read "0"
   2. Release the Program button and press the "Inc" (Up Arrow) key 3 times.
      The screen should read "3"

11. DIP Switch Settings (Turn on Switches named and leave all others off)

**Top Dry Master**

| | |
|---|---|
| Stand Alone - No Remote Display | 6 ON |
| With Remote Display | 6 & 7 ON |

**Top Dry Master with Slave**

| | | |
|---|---|---|
| With or Without Remote Display | 6 & 8 ON | Slave 2 and 6 ON |

**Top Dry Master with 2 Slaves**

| | | | |
|---|---|---|---|
| With or Without Remote Display | 6,7 & 8 ON | First Slave 2 & 6 ON | Second Slave 1,2 &6 ON |

**Top Dry Remote Display** 1 & 6 ON

12. **Temperature Sensor Testing**

A. You can find charts with the Resistance readings at various Temperatures in the following manuals
Located in **Resource 2002 CD** in the "**Resources – Manuals**" Folder
PNEG-630 Portable Dryer – Trouble Shooting Feb 1999.pdf **Page 54** (Portable Dryers | Trouble Shooting – Operating Tips)
PNEG-377 Fan & Heater – Service Manual Feb 2000.pdf **Page 50** (Fans and Heaters | Trouble Shooting Guide)
The Batch Top Dry's use the Thermister type sensors, the bolt style for the Plenum and the Grain Temperature.

You have to disconnect the wires before testing. Check the charts listed above for readings at other temperatures.

10-15-02

## Common Problems and Solutions

1.

# GSI / Top Dry

# Series 2000 Autoflow Errors and troubleshooting

* **Error Messages and solutions**
* **Operation tips**

## Error Messages

When the dryer shuts down the user can quickly determine what caused the shutdown by viewing the display on the dryer control panel. The Electronic Monitoring Control System displays the error message and sounds a warning signal to alert the user. The displayed error conditions and their electrical cause are as follows:

### Burner 1 Loss Flame

The flame sensor in burner number one has failed to detect flame. Either the burner failed to light or the flame sensor needs to be adjusted. The flame sensor is the sensor attached to the burner, and has a single lead. If the burner is lighting but the unit is still shutting down due to loss of flame the flame sensor needs to be adjusted. The flame sensor can be adjusted by bending it so it is immersed in flame. If the burner is not lighting make sure that the dryer is getting fuel, all solenoids are opening, and the ignitor is sparking.

### Burner 2 Loss Flame

The flame sensor in burner number two has failed to detect flame. Either the burner failed to light or the flame sensor needs to be adjusted. The flame sensor is the sensor attached to the burner, and has a single lead. If the burner is lighting but the unit is still shutting down due to loss of flame the flame sensor needs to be adjusted. The flame sensor can be adjusted by bending it so it is immersed in flame. If the burner is not lighting make sure that the dryer is getting fuel, all solenoids are opening, and the ignitor is sparking.

### Fan 1 Vapor High Limit

The LP gas vapor temperature sensor located on the gas pipe train downstream from the vaporizer coil on fan and heater number one has opened indicating that the vaporizer coil is running too hot and must be adjusted. This sensor is set at 200 degrees Fahrenheit and automatically resets itself when cool. The vaporizer is adjusted by loosening the bolt and moving the vaporizer coil away from the flame.

### Fan 2 Vapor High Limit

The LP gas vapor temperature sensor located on the gas pipe train downstream from the vaporizer coil on fan and heater number two has opened indicating that the vaporizer coil is running too hot and must be adjusted. This sensor is set at 200 degrees Fahrenheit and automatically resets itself when cool. The vaporizer is adjusted by loosening the bolt and moving the vaporizer coil away from the flame.

### Fan 1 Housing High Limit

The temperature high limit located on the housing on fan and heater number one opened, indicating that the housing towards the bin has overheated. This high limit sensor is set at 200 degrees Fahrenheit and must be manually reset.

### Fan 2 Housing High Limit

The temperature high limit located on the housing on fan and heater number two opened, indicating that the housing towards the bin has overheated. This high limit sensor is set at 200 degrees Fahrenheit and must be manually reset.

### Plenum High Limit

An over temperature condition has occurred inside the dryer plenum. The plenum high limit is set automatically on the Hi-lo thermostat when the cycle set-point is adjusted and resets automatically when cooled. The lo-fire gas pressure needs to be lowered, or the cycle setpoint on the Hi-lo thermostat needs to be increased if the error is displayed frequently.

### Fan 1 Motor Overload

The thermal overload in the control box on fan number one has tripped, indicating an overcurrent condition. The overload must be reset manually.

### Fan 2 Motor Overload

The thermal overload in the control box on fan number two has tripped, indicating an overcurrent condition. The overload must be reset manually.

### Fan 1 Loss Of Airflow

The contacts on the airswitch, located in the bin sidewall and attached to fan and heater number one, have opened due to the fan not turning, or the airswitch may need to be adjusted.

### Drying Chamber Overflow

The grain level in the drying chamber has reached the drying chamber overflow rotary switch. Grain will have to be dumped from the drying chamber to the storage chamber before the unit can be restarted. This error indicates that either the drying chamber high level rotary switch is faulty or the time on the Load delay or Aux. 1 delay needs to be lowered.

### Bin Grain High Limit Full

The grain level in the storage chamber has reached the storage chamber high level rotary switch located 3 feet below the fan and heater(s). Grain will have to be removed from the storage chamber before the unit can be restarted.

### Bin High Limit Switch Bad

The storage chamber high level switch has failed. Both the normally open and the normally closed sides of the switch are in the same state.

### Out Of Grain

The out of grain timer has ran for longer than it was set. Either you are out of grain or the fill system is filling to slow.

### Wet Supply Empty Press <Enter> To Dry Remaining Grain

This message is displayed when the start button is pushed and grain has fallen away from the wet supply rotary switch and there is still grain against the drying chamber low level rotary switch. If the enter button is pushed the dryer will restart, but the fill system(s) will not restart.

### Cannot Start Dryer Wet Supply Empty

This message is displayed when the start button is pushed and grain has fallen away from the wet supply rotary switch and there is no grain against the drying chamber low level rotary switch. Grain will have to be put into the wet supply tank or the drying chamber to start the dryer.

### Low Level Switch Exposed

This message is displayed when grain falls away from the drying chamber low level rotary switch after the Wet Bin Switch Delay has reached zero. If the error is being caused due to the settling of grain after the fans start the time on the Wet Bin Switch Delay can be lengthened.

### Fill 1 Motor Overload

The thermal overload in the fill system control box for fill system number one has tripped, indicating an overcurrent condition. The overload must be reset manually.

### Fill 2 Motor Overload

The thermal overload in the fill system control box for fill system number two has tripped, indicating an overcurrent condition. The overload must be reset manually.

### Aeration Overload

The thermal overload in the fill system control box for the aeration fan has tripped, indicating an overcurrent condition. The overload must be reset manually.

### Grain High Limit

The grain temperature in the drying chamber is too high. The grain temperature reached a point where it was five degrees less than the plenum cycle setpoint.

# Network Autoflow Tips

Present Version Numbers: Display ➔ 2.15 Heater ➔ 1.09 IO➔ 1.07

Note: Display version 2.14 and 2.15 will not work with Heater version 1.10 you must use version 1.09.

## Important Software and Troubleshooting tips

**Special Wire Terminals - The third unused terminal on any network connector is a 12 V ground for use with a tester.**

1. When ever you install a new display board. After you flash the software in and restart you may see an ERROR Message with some garbage characters or a negative number for temperature such as -2785 degrees. Do a Hard Boot by holding the Reset key and turning the power on to correct this stuck register value.
2. **Always do a Hard Boot after installing a new Display board.**
3. **If you have a blank or all black screen see the Contrast Adjustment in Tip #1**
4. Also when flashing new software to the IO Board turn off the load auger breaker(s). Due to a design characteristic the load auger(s) will run whenever the IO board is being flashed.
5. If the Fan motors run, but the augers and aeration fan do not, make sure the 110 volt breaker on the IO board is turned on.
6. The newest Display boards (5/1/02)can now be used on either a Topdry or Portable Dryer. In the past a Dryer Display board
   had to have wires soldered in place for the Meter Roll Speed Pot and they can also be used on either a Top Dry or Portable
   Dryer. The past Top Dry Display board without these wires could be used on a Top Dry only. The newest boards now have a
   six pin connector that the Dryer Meter Roll Speed Pot is connected to.
7. If you get a plenum High Limit Error on startup with a new system or after installing new software on a Two Fan Top Dry
   check to see if a jumper from J7-3 to J7-15 fixes it.
8. **Grain Temperature Sensors** are 10 ½" from the top of the floor rib. Older Top Drys were 14" from the flat of the floor.

## Version 2.15 Changes

### New Features

1. **Out of Grain Timer** – Located under the "**Setup**" key. This Timer monitors how long the Load system runs including delay time and shuts down the Top Dry, goes through the "Cleanout" of the Augers procedure and then gives an "**Out of Grain**" Warning. Default setting is 20 minutes. The "Load" switch "ON" position works exactly like "Auto" but ignores the Timer.

2. **The High Limits on the Grain and Plenum Temperatures** are now settable. User selects how many degrees above the set points that a "**Grain or Plenum High Limit**" Warning will be displayed. Defaults are 30 degrees for the Grain and 20 degrees above the set points. Both are settable from 10 to 50 degrees. These settings are accessed by turning on the "**Control Power**" while holding down the "M**odify**" key, in the **Extended Setup**, so they can be reset to allow operation after the User has determined there is no fire hazard. This in effect gives the system an "**Emergency Cooling**" capability.

3. The **Wet Bin Rotary Switch** now has a **Delay Setting** accessed from the "**Delay**" Key. This will delay the shutting down of the Top Dry and display of the "**Wet Bin SW Exposed**" Warning after grain no longer covers the switch. This is to allow for variations in where the switch needs to be located for differences in the moisture of the incoming grain. The New Out of Grain Timer will make this Delay less likely to be used however.

4. Implemented the "**Start Fans with High**" feature that was previously listed in the "**Extended Setup**" list but was not functional.

### Changed Names

1. "**Fan Delay**" is now "**Motor Delay**" to better describe the fact that the delay not only delays the time between when the Fans start but also the time between when any Fan or Loading Motors start.

2. When the **Drying Chamber Low Level Rotary Switch** is exposed it will now say "**Lo Level SW Exposed**" not "**Dry Chamber Empty**".

3. When the **Wet Bin Rotary Switch** is exposed it will now say "**Wet Bin SW Exposed**" not "**Dryer out of Grain**"

4. The Delay formerly called the "**Out of Grain**" Delay which delayed the shutting down of the system if grain came off the Drying Chamber Low level Switch is now called the "**Lo level SW**" Delay.

5. Under the **Extended Setup** accessed by holding down the "**Modify**" key while turning on the "**Control Power**" those items that were described as "**Tests**" are now named as just the Switch itself. Enabling the switch means it is monitored by the System

# GSI / Top Dry
# Software Diagnostics

* **Series 2000 Batch Fan & Heater**

* **Series 2000 Autoflow Display**

* **Series 2000 Autoflow Fan & Heater**

# Series 2000 Batch Fan / Heater

## Initializing the Novram

- Turn the Control Power " off ".
- Hold down the Program Temperature switch.
- Turn the Control Power switch "on " with the Program Temperature switch held down.
- Press the Increase switch until 7 is on the display.
- Press the Program Temperature switch again.
- You have two seconds to depress the Increase or Decrease switches at the same time.
- The NOVRAM has been initialized.

NOTE: The computer has now been cleared of all memory, including the type of dryer it is and all Set-up variables.

# Series 2000 Batch Fan / Heater

## Programming Set-up Variables

- Turn the Control Power " off "
- Turn the Control Power switch " on " with the Program Temperature switch held down.
- Press the Increase switch until 3 is on the display.
- Press the Program Temperature switch again.
- **C** or **no C** will bill displayed.
- Use the Increase or Decrease switch to toggle between **C** or **no C.**
  **C** - Hi-Lo cycling heater
  **no C** - On/Off cycling heater
- When the correct selection is on the screen press the Program Temperature switch again.
- **H** or **no H** will be displayed.
- Use the Increase or Decrease switch to toggle between **H** or **no H.**
  **H** - Humidity sensor present
  **no H** - No humidity sensor present
- When the correct selection is on the screen press the Program Temperature switch again.
- **F** or **C** will be displayed.
- Use the Increase or Decrease switch to toggle between **F** or **C.**
  **F** - Temperatures displayed in Fahren- heit.
  **C**-Temperatures displayed in Celsius.
- When the correct selection is on the screen press the Program Temperature switch again.
- **L** or **no L** will be displayed.
- Use the Increase or Decrease switch to toggle between **L** or **no L**.

  **L** - The dryer will advance to the Cool cycle when the Dry timer has reached zero and the Grain temperature set point has been met.
  **noL** - The dryer will advance to the Cool cycle when either the Dry timer has reached zero or the Grain temperature set point has been met.
- When the correct selection is on the screen press the Program Temperature switch again.

# Series 2000 Batch Fan / Heater

**CAUTION: DO NOT ATTEMPT BELOW PROCEDURE WITH GAS LINE CONNECTED.**

**Diagnostic Mode**

- Turn the Control Power " off ".
- Hold down the Program Temperature switch.
- Turn the Control Power switch "on " with the Program Temperature switch held down.
- Press the Increase switch until 8 is on the display.
- Press the Program Temperature switch again.
- Press the Program Dry time switch to engage the Fan starter-**Fan** will be displayed.
- Press the Increase switch to make the ignitor spark-**IN** will be displayed.
- Press the Program Temperature switch to open the LP and Main Solenoid- **LP** will be displayed.
- Press the Start switch to open the Cycle solenoid -**CS** will be displayed.
- Turn the control power "off" to exit the Diagnostic mode.

# Series 2000 Autoflow Display

**Keypad Test**

- Turn the Control Power "off".
- Turn the Control Power switch "on" with the Help Switch pressed.
- The Keypad Switches can now be tested.

**Control Switch Tests**

- Turn the Control Power "off" .
- Turn the Control Power switch "on" with the Plenum and Grain Switches pressed.
- The Control Switches can now be tested.

# Series 2000 Autoflow Fan / Heater

**CAUTION: DO NOT ATTEMPT BELOW PROCEDURE WITH GAS LINE CONNECTED.**

**Diagnostic Mode**

- Turn the Control Power " off ".
- Hold down the Program Temperature switch.
- Turn the Control Power switch "on " with the Program Temperature switch held down.
- Press the Program Dry time switch to engage the Fan Starter.
- Press the Program Temperature switch to start theIgnitor.
- Press the Hours x 1000 switch to open the Ssolenoid.
- Turn the control power "off" to exit the Diagnostic mode.

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