

Top Dry

1998 Service School

PNEG-692



a division of
THE GSI GROUP



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Roof Damage Warning and Disclaimer.....	4
Safety.....	5
Safety Precautions.....	6
Safety Sign-Off Sheet.....	7
Electrical Power Supply.....	8
Initializing the Novram.....	9
Programming Set-Up Variables.....	10
Series 2000 Diagnostic Mode.....	11
Series 2000 Software Changes.....	12
1997 Ignition Update Kit Installation Instructions.....	13
1997 Airswitch Update Kit Installation Instructions.....	17
1997 Grain Temperature Sensor Update Kit Installation Instructions.....	20
Warranty.....	23

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.

Fan/Heater Installation & Operating Instructions

Thank you for choosing a Top Dry Series 2000 Fan and Heater unit. It is designed to give excellent performance and service for many years.

This manual describes the installation for all standard production Top Dry Series 2000 single fan, multi-fan and 2000 Series Heater Control units. Different models are available for liquid propane or natural gas fuel supply, with either single phase 230 volt, or three phase 208, 220, 380, 460 or 575 volt electrical power.

The principal concern of the GSi Group, Inc. ("GSi") is your safety and the safety of others asso-

ciated 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.

**! WARNING**

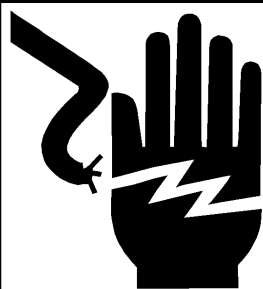
Stay clear of rotating blade. Blade could start automatically. Can cause serious injury. Disconnect power before servicing.

DC-1225

**! WARNING**

Flame and pressure beyond door. Do not operate with service door removed. Keep head and hands clear. Can cause serious injury.

DC-1227

! DANGER!

High voltage. Will cause serious injury or death. Lockout power before servicing.

DC-1224

! DANGER!

Automatic equipment can start at anytime. Do not enter until fuel is shut off and electrical power is locked in off position. Failure to do so will result in serious injury or death.

DC-973

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 times when handling, assembling, installing and operation of the product and/or components.

Guards are removed for illustration purpose only. All guards must be in place before/during operation.

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
OUTSIDE 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.

Date

Employer's Signature

Employee

[illegible]

Power Supply

An adequate power supply and proper wiring are important factors for maximum performance and long life of the dryer. Electrical service must be adequate enough to prevent low voltage damage to motors and control circuits (see Electrical Load Information). **In 220V 1 phase and 220V 3 phase systems, a separate neutral wire is required for the 120V heater circuit, and should be connected to terminal #1 in the master heater. Do not run in conduit with motor power lines.**

Transformer and Wiring Voltage Drop

It is necessary to know the distance from the unit to the available transformer, and the horsepower of your fan unit. Advise the service representative of your local power supplier that an additional load will be placed on the line. Each fan motor should be wired through a fused or circuit breaker disconnect switch. Check on KVA rating of transformers, considering total horsepower load. The power supply wiring, main switch equipment and transformers must provide adequate motor starting and operating voltage. Voltage drop during motor starting should not exceed 14% of normal voltage, and after motor is running at full speed it should be within 8% of normal voltage. Check Electrical Load Information for HP ratings and maximum amp loads to properly size wire and fusing elements. Standard electrical safety practices and codes should be used. (Refer to National Electrical Code Standard Handbook by National Fire Protection Association).

Machine to Earth Grounding

It is very important that a *Machine To Earth Ground Rod* be installed at the fan. This is true even if there is a ground at the pole 15 feet away. Place the ground rod that comes standard, within 8 feet of the dryer and attach it to the dryer control panel with at least a #6 solid, bare, copper ground wire and the clamp provided. The grounding rod located at the power pole will not provide adequate grounding for the dryer. The proper grounding will provide additional safety in case of any short and will ensure long life of all circuit

boards, and the ignition system. The ground rod must be in accordance with local requirements.

Proper Installation of Ground Rod

It is not recommended that the rod be driven into dry ground.

Follow these instructions for proper installation:

1. Dig a hole large enough to hold 1 to 2 gallons of water.
2. Fill hole with water.
3. Insert rod through water and jab it into the ground.
4. Continue jabbing the rod up and down. The water will work its way down the hole, making it possible to work the rod completely into the ground. This method of installing the rod gives a good conductive bond with the surrounding soil.
5. Connect the bare, copper ground wire to the rod with the proper ground rod clamp. See Figure 8.
6. Connect the bare copper ground wire to the fan control boxes with a grounding lug.

7. Ground wire must not have any breaks or splices.



Dig a hole large enough to hold 1 or 2 gallons of water. Work the ground rod into the earth until it is completely in the ground.

Initializing the Novram

- | | |
|---|--|
| <ul style="list-style-type: none">• 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. | <ul style="list-style-type: none">• 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. <p>NOTE: The computer has now been cleared of all memory, including the type of dryer it is and all Set-up variables.</p> |
|---|--|

Programming Set-up Variables

- | | |
|--|---|
| <ul style="list-style-type: none"> • 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 be 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. | <ul style="list-style-type: none"> • F or C will be displayed. • Use the Increase or Decrease switch to toggle between F or C.
 F - Temperatures displayed in Fahrenheit.
 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. |
|--|---|

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.

Significant Software changes since July 12, 1995

(Software version number is displayed at all units on power-up)

◆ Software Version 0.10

The fan, on any fan/heater unit, will not shut off if flame is sensed illegally until flame is no longer sensed.

◆ Software Version 0.12

When a shutdown occurs while drying you can view the number of hours since the shutdown by pressing the decrease switch.

Limited the maximum temperature setting to 230 degrees F.

◆ Software Version 0.14

You can change the Dry and Cool times while the dryer is running, press the increase and decrease switches at the same time after the new times have been entered and the program mode exited, and the new times will be loaded immediately.

Holding the increase switch while pressing the start switch will start both the fan and heater in a continuous heat cycle. 99.9 hours will be displayed on the screen forever or until the unit is powered down.

Holding the decrease switch while pressing the start switch will start both the fan and heater in a continuous cool cycle. 99.9 hours will be displayed on the screen forever or until the unit is powered down.

◆ Software Version 0.15

On some errors you could not view the hours since shutdown-fixed that problem.

◆ Software Version 0.17

On two fan units, when the slave shut down the master fan would not shut off-fixed that problem.

When a limit error is given the screen now says: **000** instead of just displaying the temperature.

◆ Software Version 0.18

The dryer will not advance to the cool cycle for at least ten minutes after start-up. This allows the grain temperature sensor to stabilize.

Fixed a problem with display flicker on two fan units.

◆ Software Version 0.19

Added software for a humidity sensitive controller.

◆ Software Version 0.20

Created a option in the set-up mode: L or no L

If L is selected, the Dry timer has to be at zero and the grain temperature has to be at the desired setpoint before the unit will advance to the cool cycle.

Significant Software changes since July 12, 1995,continued

(Software version number is displayed at all units on power-up)

If L is selected, the dryer timer has to be at zero and the grain temperature has to be at the desired set point before the unit will advance to the cool cycle.

If no L is selected, the dry timer has to be at zero or grain temperature has to be at the desired set point before the unit will advance to the cool cycle.

If the grain temperature exceeds 200 degrees F, after the initial 10 minutes of the dry cycle, the dryer will advance to the cool cycle.

In some instances the plenum temperature would jump to 275 degrees F - fixed that problem.

◆ Software Version 0.21

When in the Top Dry mode the heater is always set up as a hi-lo fire unit.

◆ Software Version 0.22

When setting the dry time to 3.2 hours the display would say .32 hours when the program mode was exited - fixed that problem.

Clearing the NOVRAM is now done by powering up with the program temperature switch held down, press the increase switch until a 7 is displayed and press the program temperature switch again. You have two seconds to press the increase and decrease switches at the same time to clear the NOVRAM.

◆ Software Version 0.23

By placing dipswitch #3 in the "on" position you can disable the airswitch test.

In the Top Dry mode, if J5-3 and J5-4 are shorted together the unit will jump immediately to the cool cycle, even if the dryer has been running less than 10 minutes.

1997 Ignition Update Kit Installation Instructions**Packing List:**

(1) HH-1093	2-pole Ignition Transformer
(4) S-2786	#8-32 x 3/8" Screw
(4) S-6555	18ga Butt Splice Connector
(2) 00401174	Terminal Spade Tongue
(1) PNEG-627	Top Dry '97 Ignition Update Kit Instruction

Tools Required:

One pair of wire cutters

One pair of wire strippers

One pair of crimpers

One drill with a Phillips screw bit

Installing the new two pole ignition transformer

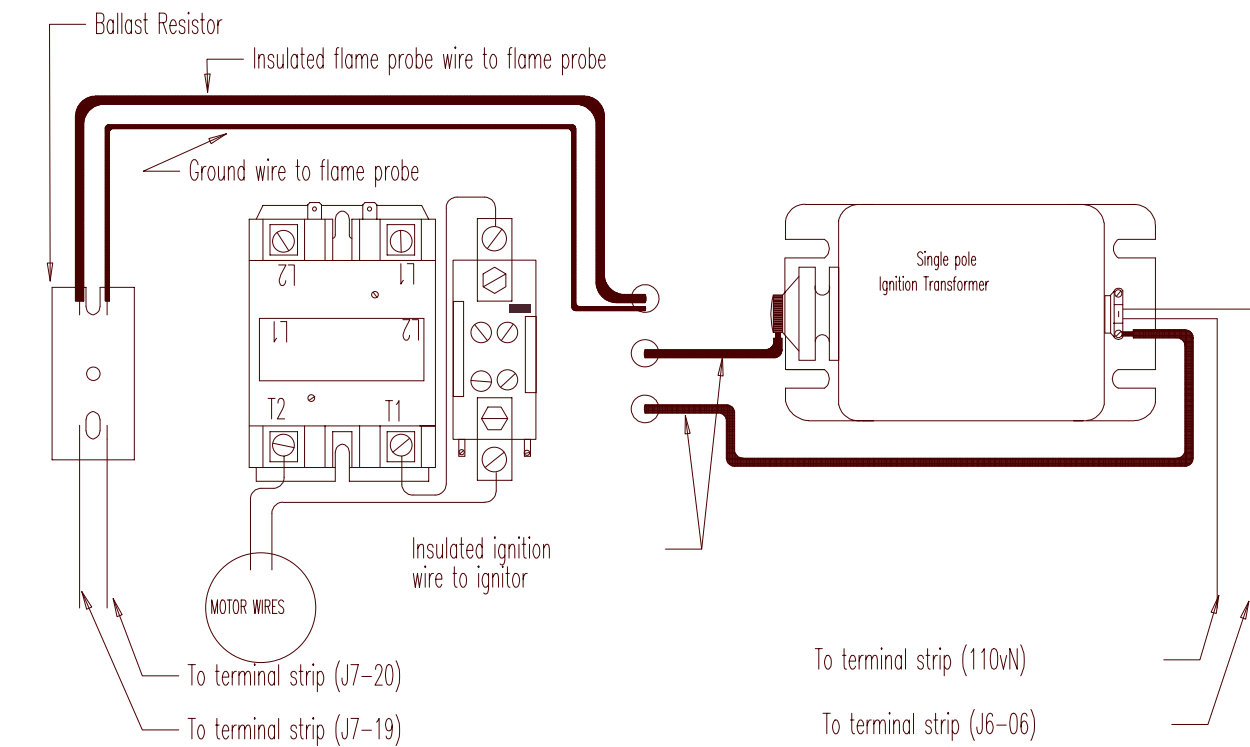
- 1) Remove the two insulated ignition wires from the single pole ignition transformer.
- 2) Cut the two wires that go from the terminal strip to the ignition transformer so that you can splice the two wires on the new transformer with the wires from the terminal strip.
- 3) Remove the four screws that mount the single pole ignition transformer to the control box.
- 4) Remove the single pole ignition transformer. This transformer is still good and can be used in the future on non-Series 2000 Top Dry units, or for temporary replacements on Series 2000 Top Dry units.
- 5) Mount the new two pole transformer to the control box using the four 3/8" screws.

- 6) Connect the two insulated ignition wires to the two pole transformer using the two fork connectors.
- 7) Splice the two wires from the two pole ignition transformer with the two wires that were cut in step #2 using two of the butt splice connectors.

Bi-Passing the ballast resistor(s):

- 1) Remove two of the wires that are opposite one another long ways on the ballast resistor (in systems with two ballast resistors remove the two wires from one of the ballast resistors).
- 2) Splice these two wires together using one of the butt splice connectors.
- 3) Remove the other two wires from the ballast resistor (in systems with two ballast resistors remove the wires from the other ballast resistor).
- 4) Splice these two wires together using the last butt splice connector.

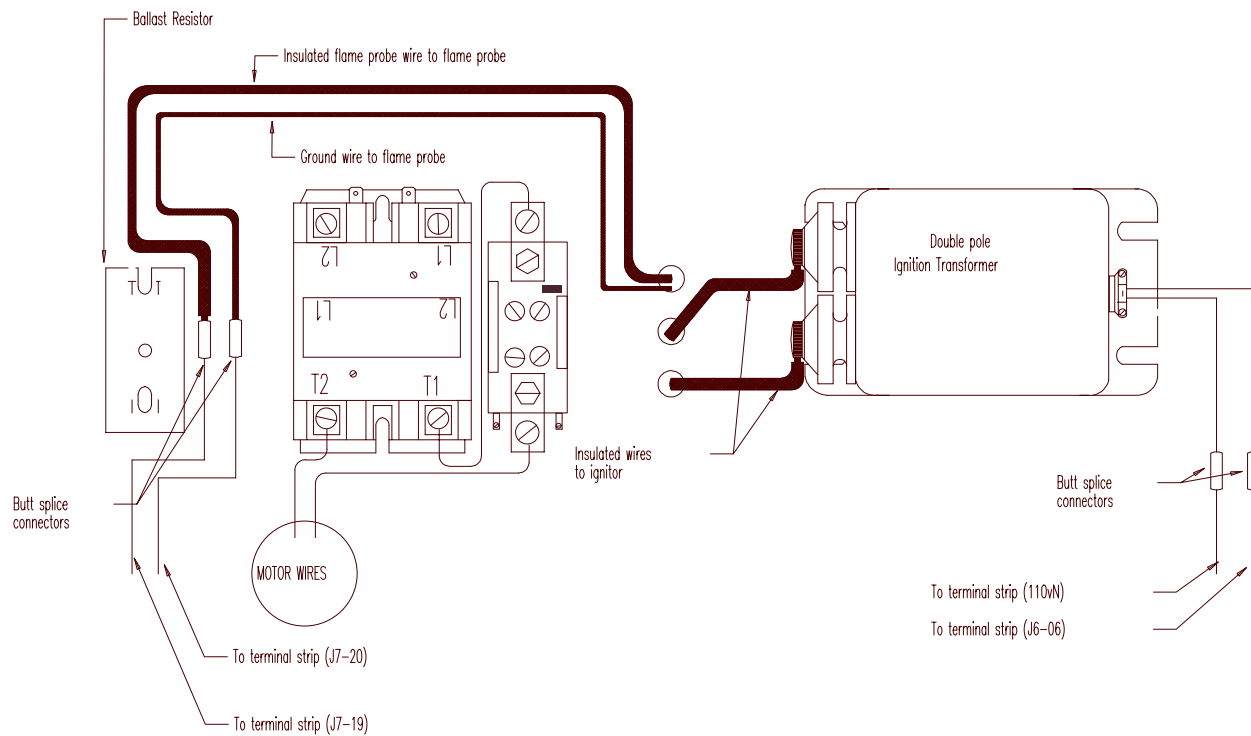
1997 Ignition Update Kit Installation Instructions



Details the wiring of the single pole ignition transformer before installation of the two pole ignition transformer.

PNEG-627

1997 Ignition Update Kit Installation Instructions



Details the wiring of the double pole ignition transformer after installation.

PNEG-627

1997 Airswitch Update Kit Installation Instructions

Packing List:

(1) TF-1278	TD Airswitch assembly
(1) FH-1310	Heyco cord connector
(1) FH-1309	Lock Nut 1/2"
(4) S-280	Screw #10- 16 x 5/8 self drill
(1) PNEG-628	TD '97 Airswitch Update Kit Instructions

Tool Required:

One pair of wire cutters

One pair of wire strippers

One drill with a 5/16" nut driver and 3/4" drill bit

One regular screwdriver or Entrelec terminal tool (depends on what type of terminals the unit has)

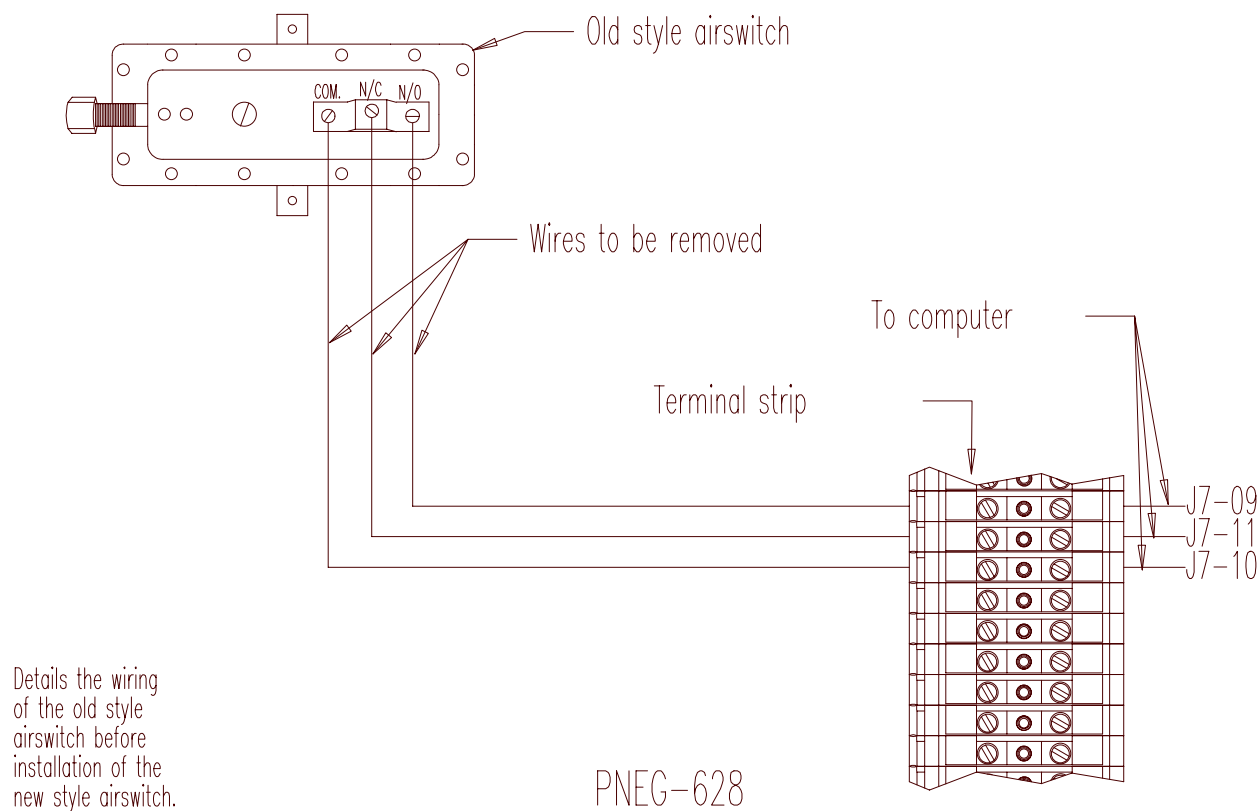
Installing the new airswitch:

- 1) On either side of the master fan/heater, drill one 3/4" hole even with the fan/heater unit in a valley on the bin sidewall.
- 2) Insert the airswitch probe through the 3/4" hole.
- 3) Position the housing so the cord exists the housing horizontally, and the vents open downward.
- 4) Use the four self drilling screws to mount the housing to the bin sidewall.
- 5) Caulk between the housing and the sidewall to seal.
- 6) Remove a knockout in the fan control box on the master heater.
- 7) Install the Heyco cord connector in the knockout hole.
- 8) Run the cord from the airswitch through the Heyco cord connector and into the control box.
- 9) Tighten the Heyco cord connector onto the cord.

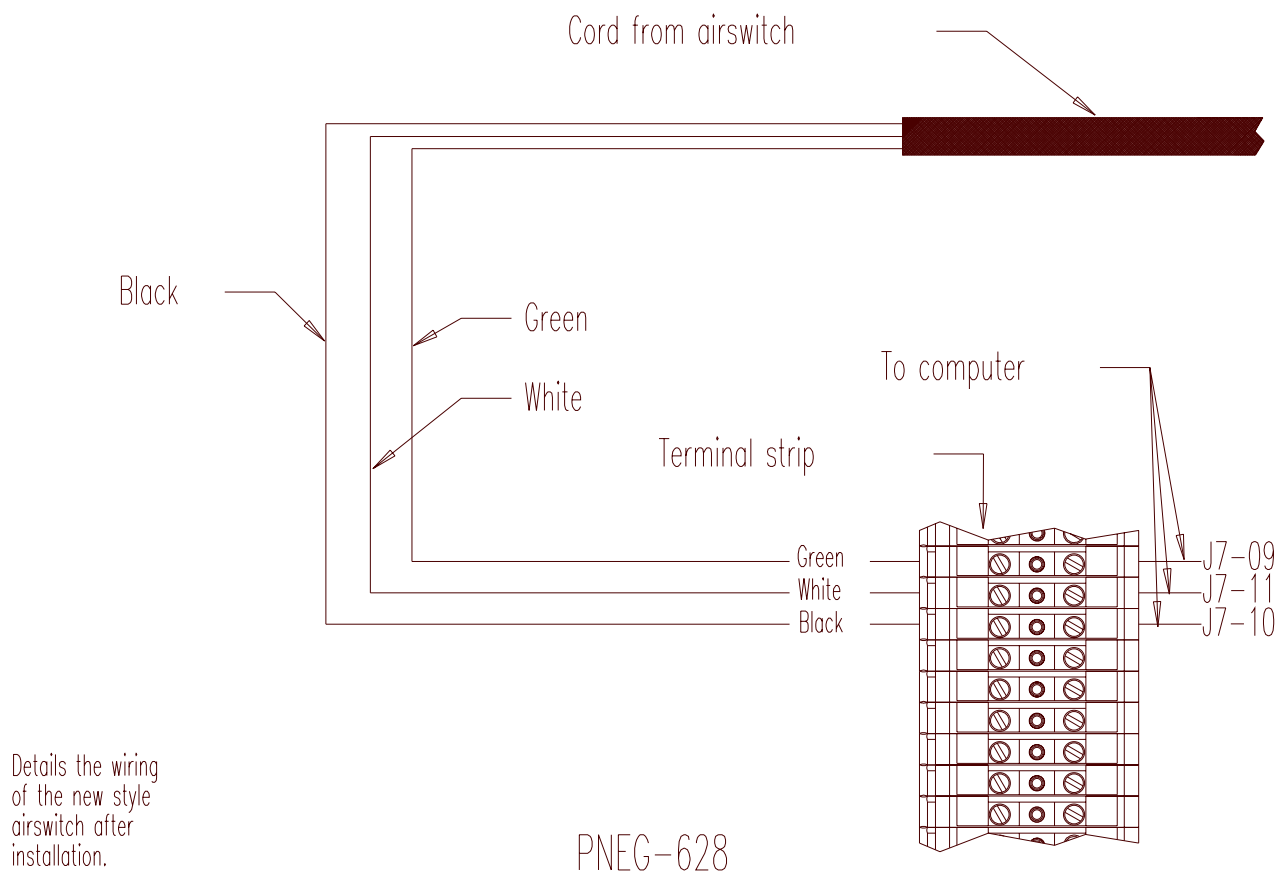
Wiring the new airswitch:

- 1) Remove the three wires from the terminal strip that are attached to the old airswitch (opposite J7-9, J7-11 and J7-10 on the terminal strip).
- 2) Attach the green wire from the cord on the new airswitch to the terminal strip opposite J7-09.
- 3) Attach the white wire from the cord on the new airswitch to the terminal strip opposite J7-11.
- 4) Attach the black wire from the cord on the new airswitch to the terminal strip opposite J7-10.
- 5) In two fan units, place dipswitch #3 on the slave fan/heater in the "on" position. This will bypass the old airswitch in the slave unit.
- 6) When starting the dryer with grain in the drying chamber make sure that the airswitch does not close until both units are half speed.

1997 Airswitch Update Kit Installation Instructions



1997 Airswitch Update Kit Installation Instructions



1997 Grain Temperature Sensor Update Kit Installation Instructions

Packing List:

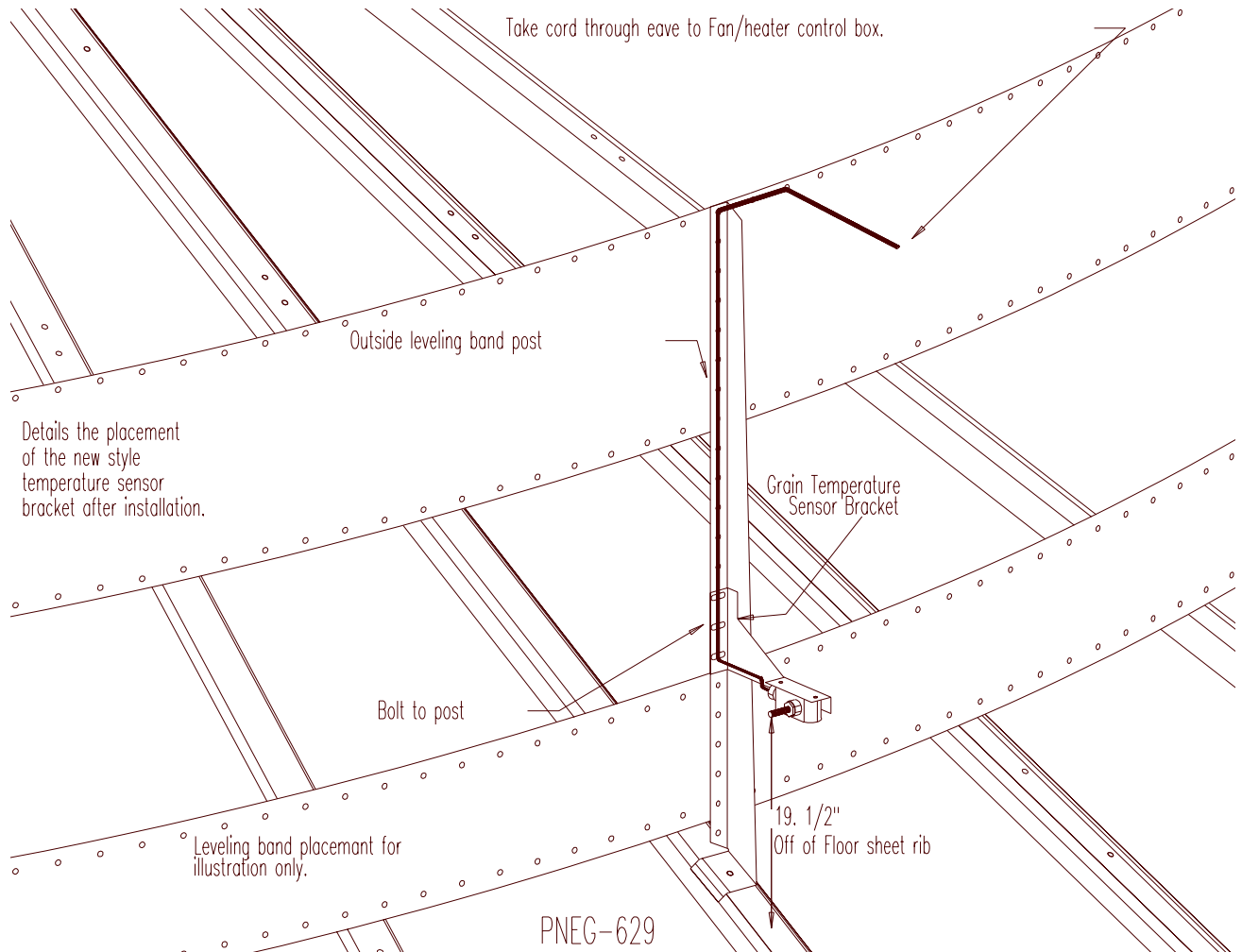
- | | |
|--------------|--|
| 1) TF-1425 | TD Series 2000 Grain Temperature Sensor Assembly |
| 2) S-275 | Bolt 5/16-18 x 3/4 |
| 3) S-396 | Nut 5/16 - 18 Hex |
| (1) PNEG-629 | TD '97 Grain Temperature Update Kit Instructions |

Tool Required:

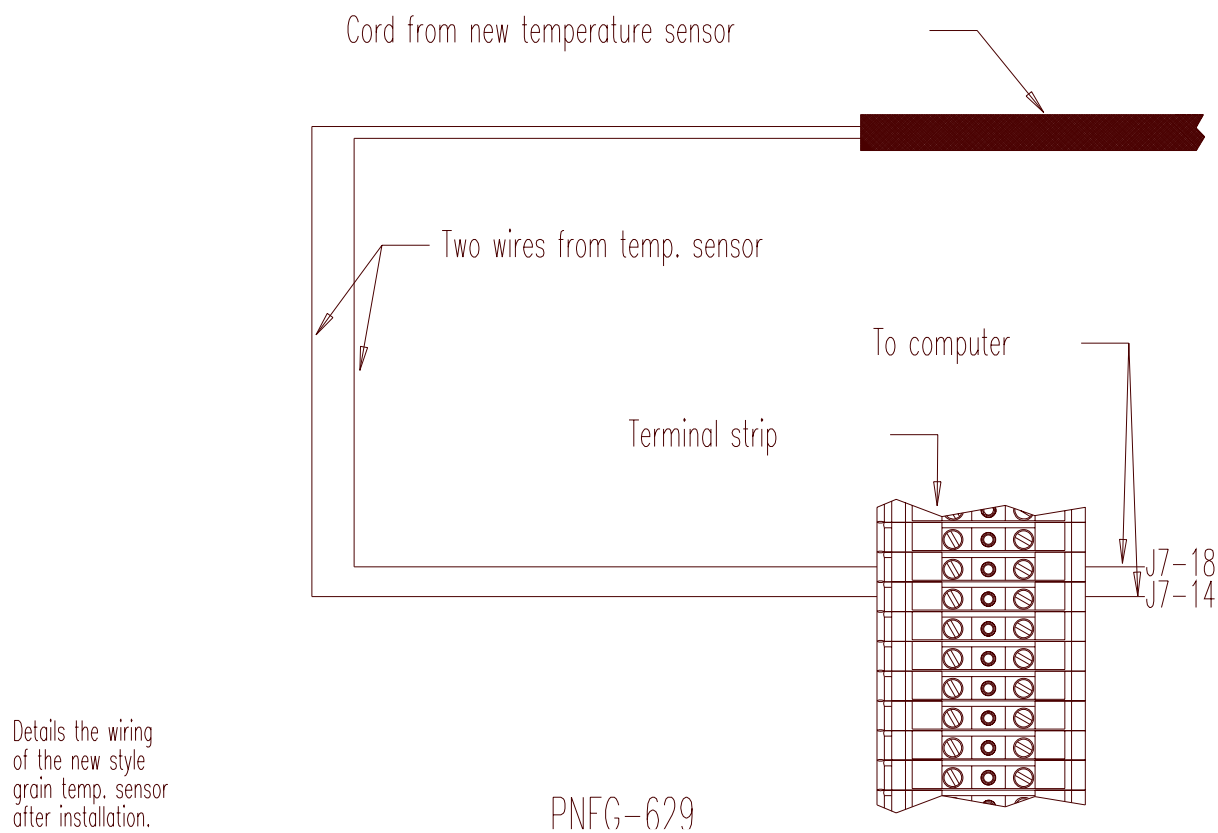
- One pair of wire cutters
- One pair of wire strippers
- Two 1/2" wrenches
- One regular screwdriver or Entrelec terminal tool (depends on what type of terminals the unit has)

Installing the new grain temperature sensor assembly:

- | | |
|--|--|
| <ul style="list-style-type: none">1) In the control box remove the two wires from the terminal block for the old grain temperature sensor (opposite J7-18 and J7-14 on the terminal strip).2) Remove the cord from the control box.3) Remove the old temperature sensor and sensor housing from the leveling band post (the temperature sensor is still good and can be kept).4) Mount the new grain temperature sensor bracket to the outside leveling band post using the 3 supplied nuts and bolts so that the temperature sensor is 19 1/12" above the floor sheet rib. | <ul style="list-style-type: none">5) Run the cord from the grain temperature sensor up the leveling band post and across the top leveling band to the point closest to the fan/heater unit.6) Take the cord out of the drying chamber through the bin eave.7) Run the new grain temperature sensor cord through the Heyco cord connector in the control box that was used by the old grain temperature sensor.8) Install the two wires in the cord from the new temperature sensor in the terminal block where the wires from the old temperature sensor were removed (opposite J7-18 and J7-14 on the terminal strip). |
|--|--|

1997 Grain Temperature Sensor Update Kit Installation Instructions

1997 Grain Temperature Sensor Update Kit Installation Instructions



Details the wiring of the new style grain temp. sensor after installation.

THE GSI GROUP, INC. ("GSI") WARRANTS ALL PRODUCTS MANUFACTURED BY GSI TO BE FREE OF DEFECTS IN MATERIAL AND WORKMANSHIP UNDER NORMAL USAGE AND CONDITIONS FOR A PERIOD OF TWELVE MONTHS AFTER RETAIL SALE TO THE ORIGINAL END USER OF SUCH PRODUCTS. GSI'S ONLY OBLIGATION IS, AND PURCHASER'S SOLE REMEDY SHALL BE FOR GSI, TO REPAIR OR REPLACE, AT GSI'S OPTION AND EXPENSE, PRODUCTS THAT, IN GSI'S SOLE JUDGMENT, CONTAIN A MATERIAL DEFECT DUE TO MATERIALS OR WORKMANSHIP. ALL DELIVERY AND SHIPMENT CHARGES TO AND FROM GSI'S FACTORY WILL BE PURCHASER'S RESPONSIBILITY. EXPENSES INCURRED BY OR ON BEHALF OF THE PURCHASER WITHOUT PRIOR WRITTEN AUTHORIZATION FROM AN AUTHORIZED EMPLOYEE OF GSI SHALL BE THE SOLE RESPONSIBILITY OF THE PURCHASER.

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PRIOR TO INSTALLATION, PURCHASER HAS THE RESPONSIBILITY TO RESEARCH AND COMPLY WITH ALL FEDERAL, STATE AND LOCAL CODES WHICH MAY APPLY TO THE LOCATION AND INSTALLATION



a d i v i s i o n o f

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March 1998