Calc-U-Dri Moisture Monitor

Owner's Manual

PNEG-1154

Version: 2.0

Date: 02-22-18

PNEG-1154

All information, illustrations, photos and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

Contents

Safety Guidelines

Safety guidelines are general-to-specific safety rules that must be followed at all times. This manual is written to help you understand safe operating procedures and problems that can be encountered by the operator and other personnel when using this equipment. Save these safety guidelines for future reference.

As owner or operator, you are responsible for understanding the requirements, hazards, and precautions that exist and to inform others as required. Unqualified persons must stay out of the work area at all times.

Alterations must not be made to the equipment. Alterations can produce dangerous situations resulting in SERIOUS INJURY or DEATH.

This equipment must be installed in accordance with the current installation codes and applicable regulations, which must be carefully followed in all cases. Authorities having jurisdiction must be consulted before installations are made.

When necessary, you must consider the installation location relative to electrical, fuel and water utilities.

Personnel operating or working around equipment must read this manual. This manual must be delivered with equipment to its owner. Failure to read this manual and its safety instructions is a misuse of the equipment.

ST-0001-3

Cautionary Symbols Definitions

Cautionary symbols appear in this manual and on product decals. The symbols alert the user of potential safety hazards, prohibited activities and mandatory actions. To help you recognize this information, we use the symbols that are defined below.

DANGER — This symbol indicates an imminently hazardous situation which, if not avoided, **will result in serious injury or death.**

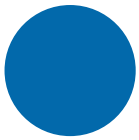
WARNING — This symbol indicates a potentially hazardous situation which, if not avoided, **can result in serious injury or death.**

CAUTION — This symbol indicates a potentially hazardous situation which, if not avoided, **can result in minor or moderate injury.**

NOTICE — This symbol is used to address practices not related to personal injury.

This symbol indicates a general hazard.

This symbol indicates a prohibited activity.



This symbol indicates a mandatory action.

ST-0005-2

Safety Cautions

Use Personal Protective Equipment

- Use appropriate personal protective equipment:

Eye Protection

Respiratory Protection

Foot Protection

Hearing Protection

Head Protection

Fall Protection

Hand Protection

- Wear clothing appropriate to the job.
- Remove all jewelry.
- Tie long hair up and back.

ST-0004-1

Follow Safety Instructions

- Carefully read all safety messages in this manual and safety signs on your machine. Keep signs in good condition. Replace missing or damaged safety signs. Be sure new equipment components and repair parts include the current safety signs. Replacement safety signs are available from the manufacturer.
- Learn how to operate the machine and how to use controls properly. Do not let anyone operate without instruction.
- If you do not understand any part of this manual or need assistance, contact your dealer.

ST-0002-1

Maintain Equipment and Work Area

- Understand service procedures before doing work. Keep area clean and dry.
- Never service equipment while it is operating. Keep hands, feet, and clothing away from moving parts.
- Keep your equipment in proper working condition. Replace worn or broken parts immediately.

ST-0003-1

Install and Operate Electrical Equipment Properly

- Electrical controls must be installed by a qualified electrician and must meet the standards set by applicable local codes (National Electrical Code for the US, Canadian Electric Code, or EN60204 along with applicable European Directives for Europe).
- Lock-out power source before making adjustments, cleaning, or maintaining equipment.
- Make sure all equipment and bins are properly grounded.

ST-0075-1

Safety Sign-Off Sheet

Below is a sign-off sheet that can be used to verify that all personnel have read and understood the safety instructions. This sign-off sheet is provided for your convenience and personal record keeping.

Date	*Employee Name*	*Supervisor Name*

ST-0007

CAUTION

Operator Qualifications

Operation of this farmstead equipment shall be limited to competent and experienced persons. In addition, anyone who will operate or work around power equipment must use good common sense. In order to be qualified, he must also know and meet all other requirements, such as:

1. ***Some regulations specify that no one under the age of 16 may operate power machinery. This includes farmstead equipment. It is your responsibility to know what these regulations are in your own area or situation.***
2. ***Current OSHA regulations state in part: "At the time of initial assignment and at least annually thereafter, the employer shall instruct every employee in the safe operation and servicing of all equipment with which the employee is, or will be involved."****
3. ***Unqualified persons are to stay out of the work area. The "Work Area" is defined as any area within the grain drying and storage complex where this equipment is installed.***
4. ***A person who has not read and understood all operating and safety instructions is not qualified to operate the machine.***

**** Federal occupational Safety and Health Standards for agriculture subpart D, Section 1928.57 (a) (6).***

CAUTION

Be a safe operator.

1. ***Read and understand the Owner's Manual.***
2. ***Disconnect all electrical power before servicing or opening control box, adjusting or lubricating the equipment.***
3. ***All electrical hook-ups should be in accordance to the National Electrical Code.***
4. ***Ground all electrical equipment as well as bin itself.***
5. ***Only knowledgeable and trained personnel should operate this equipment.***
6. ***NEVER WORK WITH BELTS OR AUGERS WITH POWER "ON". Automatic controls may start without warning. Stay clear of motors, belts and augers.***

Failure to follow these instructions may result in personal injury or property damage.

2. Safety Decals

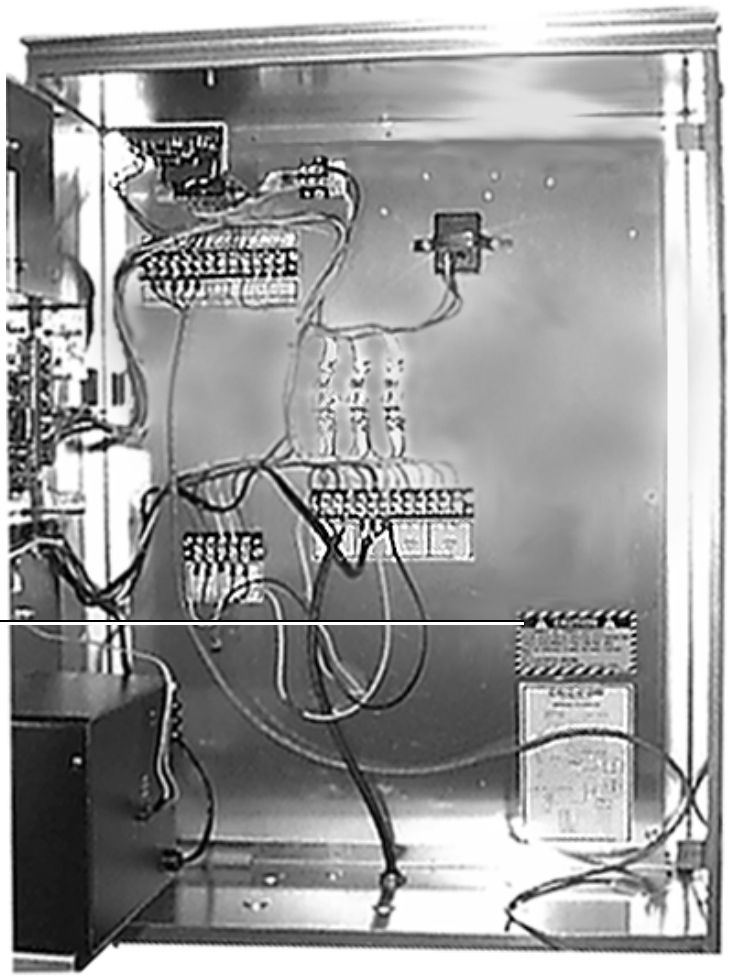
The decal shown below must be displayed as shown replacements are available upon request.

The GSI Group
1004 E. Illinois St.
Assumption, IL 62510
Phone: 1-217-226-4421

NOTES:

1. *The decal on this page is not actual size.*
2. *Keep all decals wiped clean at all times.*
3. *All decals must be replaced if they are destroyed, missing, painted over or can no longer be read.*

Part #: 801L010



Introduction

The Calc-U-Dri Moisture Monitor will monitor and display the moisture content of grain as it is moving past the sensor or in static grain. It is available in 115 Volts AC and can fit almost any application to provide a means to control other equipment.

The chart recorder option or printer option will work with this model.

Sensor Installation

The installation and mounting of the sensor for the moisture monitor is very critical. It can be installed in augers, flat bottom “U” troughs and down spouts. For best results, follow these recommendations:

1. For inclined, horizontal or vertical augers it is recommended that the clearance between the flighting and tube be no more than 1/2".
2. The flow rate of grain over the sensor is recommended to be at least 225 bu/hr. Lower rates will work but require modifications to ensure adequate grain depth on the sensor.
3. An auger must have at least one full pitch of flighting on both sides of the sensor.
4. Avoid placing the sensor in a location where condensation or other moisture may accumulate.
5. Use sensor location as shown in *Figure 3A on Page 12* as a guideline for installation.

Disconnect power to the auger motor before proceeding any further.

Sensor Installation in Augers

1. Determine the best location for the sensor in the auger. There must be at least one full pitch of flighting on both sides of the sensor to move grain over the blade.

2. Position the optional sensor connecting band (available in 6" and 8" diameters) so that the rectangular hole is toward the discharge end. Mark the outline of the rectangular hole and the edges of the band on the auger tube. Cut a hole in the tube 8" long and up about 1/3" of the way around the tube to remove the rectangular hole outline (stay inside the end marks of the connecting band). This large hole is to make it easier to remove the flighting. *(See Figure 3B on Page 13.)*

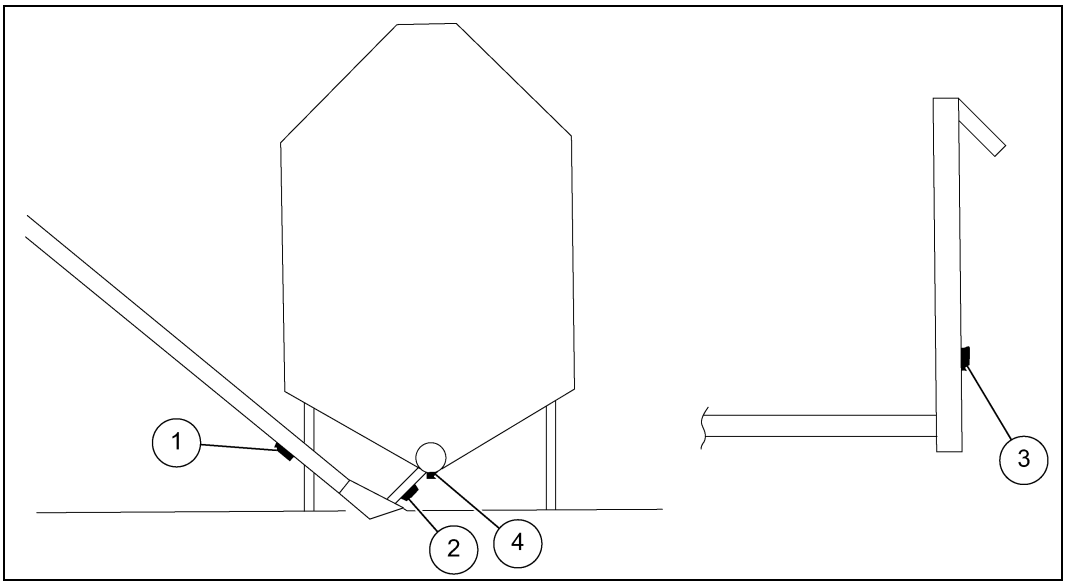


Figure 3A

Ref #	Description
1	Typical sensor location in take-away auger.
2	Use a funnel type of restrictor to ensure grain moves over sensor blade.

Ref #	Description
3	Vertical mounts same as horizontal or inclined.
4	Flighting to tube clearance should be 1/2" or less.
	Condensation from dryer may affect sensor.
	There should be one full pitch of flighting before and after sensor.

3. Replace the connecting band on the tube in the same position as in step one and mark the flighting at each end of the rectangular hole. Slide the connecting band out of the way and weld the flighting to the shaft 3/8" beyond each mark. Cut out 6-1/2" of flighting between the welds, making sure that the flighting is removed all the way to the shaft. *(See Figure 3C on Page 13.)*

4. Smooth all of the rough edges around the cutout area and position the connecting band with the rectangular hole on the bottom centered on the area where the flighting was removed. Insert the sensor clearance gauge in the hole to check for flighting clearance before tightening the connecting band. *(See Figure 3D on Page 13.)*

5. Mount the sensor in the bottom of the auger tube (six o'clock (6:00) position) in the connecting band such that the grain will flow over the sensor blade per the decals on the sensor assembly. Make sure that the sensor block fits securely in the rectangular hole before fastening the sensor to the tube with the worm gear type clamp. Fasten the grounding strap from the sensor to the auger tube in the area that the flighting has been removed with a self-drilling screw. Leave at least 2" between the sensor block and the grounding screw.

Sensor Installation in Flat Bottom U Trough Augers

1. Determine the best location for the sensor in the auger. There must be at least one full pitch of flighting on both sides of the sensor and no more than 1/2" clearance between the bottom and the edge of the flighting to ensure that grain is moved over the sensor blade. (See *Figure 3C* and *Figure 3E on Page 14*.)

CAUTION

Slowly rotate the auger by hand one complete revolution. The flighting must miss the gauge completely and not rub on the filler pieces. If there are areas of binding or hitting, correct the situation now.

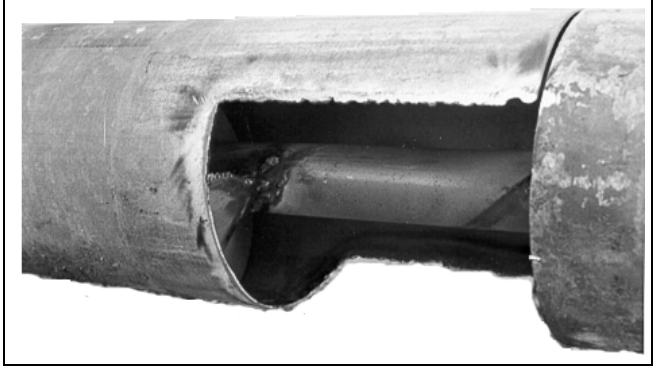


Figure 3B

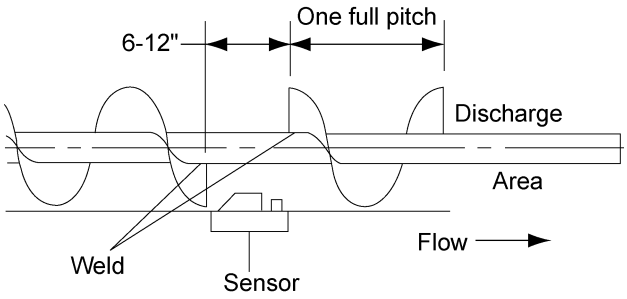
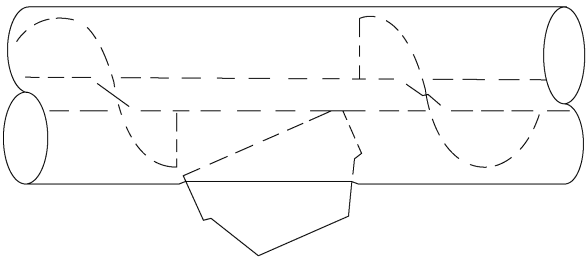
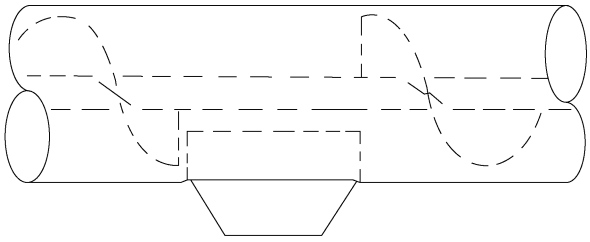


Figure 3C



How to insert gauge



Gauge and flight properly installed

Figure 3D

CAUTION

Disconnect power to the auger motor before proceeding any further.

2. Mark the location for the sensor on the trough, using the template provided to mark a 1-11/16" by 5-11/16" rectangular hole. Cut this rectangle out carefully to make sure that the sensor block fits tight. It is recommended that this hole be cut with a saw, not a torch. *(See Figure 3G on Page 14.)*

3. Reposition the bottom of the trough and mark the flighting at each end of the rectangular sensor hole. Remove the trough and find the marks that you made on the flighting. Make a new mark where you will be cutting the flighting, 1/2" larger on each end. Weld the flighting to the shaft beyond each mark. Cut out 6-1/2" of flighting between the welds, making sure that the flighting is removed all the way to the shaft. This will work on all augers 8" and smaller in diameter. A 1" ribbon of flighting may be left on the shaft for augers larger than 8". Smooth out all rough edges on the flighting and sensor hole. *(See Figure 3C.)*

4. If the trough has a flat bottom, filler pieces 12" long may be required to keep the grain closer to the sensor blade. Make sure that the leading edges are closed and welded securely. *(See Figure 3F.)*

5. Re assemble the auger trough. Check to make sure that the filler pieces clear the flighting. Insert the sensor clearance gauge in the rectangular hole to check for flighting clearance. *(See Figure 3D on Page 13.)*

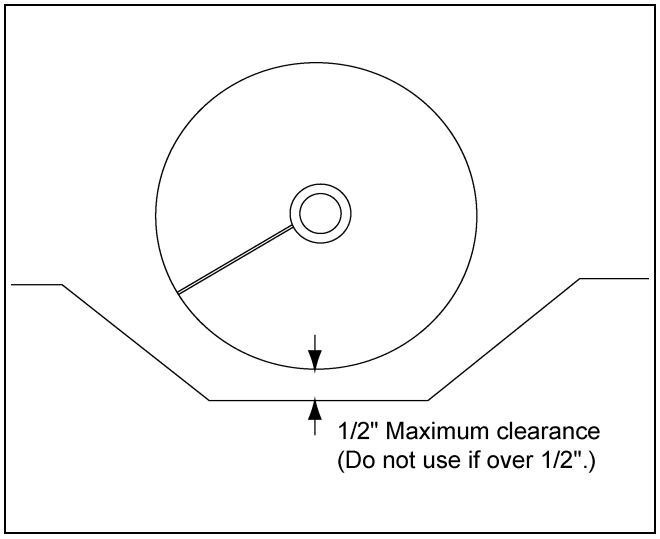


Figure 3E

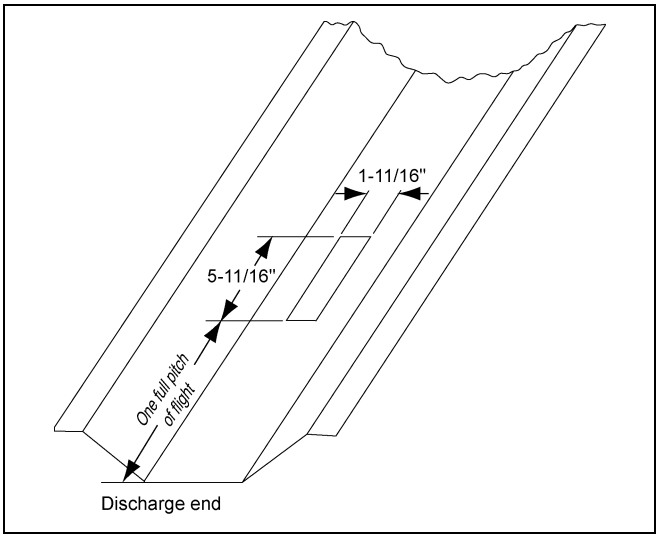


Figure 3G

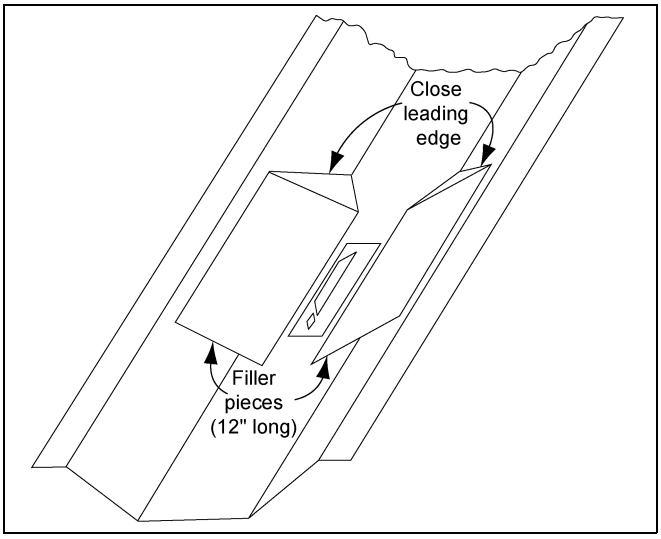


Figure 3F

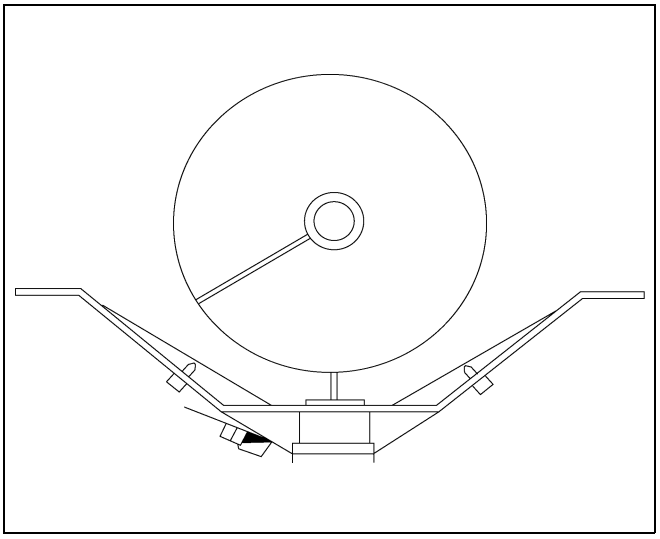


Figure 3H

CAUTION

Slowly rotate the auger by hand one complete revolution. The flighting must miss the gauge completely and not rub on the filler pieces. If there are areas of binding or hitting, correct the situation now.

6. Mount the sensor in the trough such that the grain will flow over the sensor blade per the decals on the sensor assembly. Make sure that the sensor block fits securely in the rectangular hole. Secure the sensor assembly by modifying the worm gear clamps and screwing the ends to the sides of the trough. *(See Figure 3H.)* Fasten the grounding strap from the sensor to the trough in the area that the flighting has been removed with a self-drilling screw. Leave at least 2" between the sensor block and the grounding screw.

Sensor Installation in a Flat Bottom Down Spout

1. When using a down spout, there must be a constant flow of grain over the sensor and the sensor blade must be completely covered for accurate readings. This flow must be independent of the total flow or velocity of the stream of grain. To do this, the installation of brackets angled to create a funnel is recommended.

   The sensor should be located in an accessible location, so it can be periodically inspected for trash build-up.

2. Cut a hole in the bottom of the spout (1-11/16" x 5-11/16") as shown in *Figure 3I*. Use a sabre saw for the hole, not a torch. Remove burrs and check so the sensor block fits into the stepped edge.

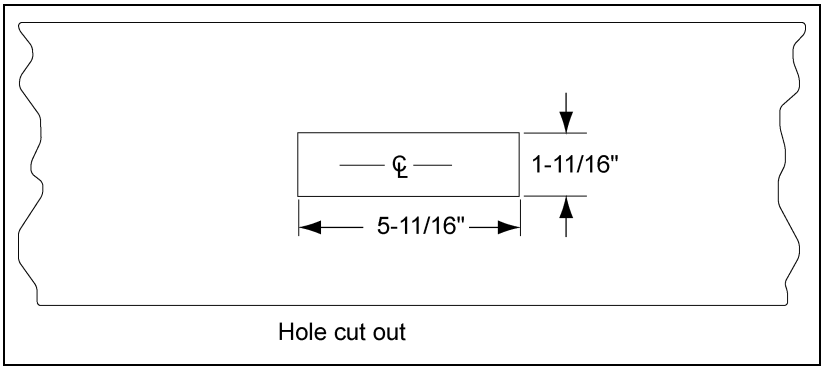


Figure 3I *Top View*

3. Attach a pair of angled brackets as shown in *Figure 3J*.

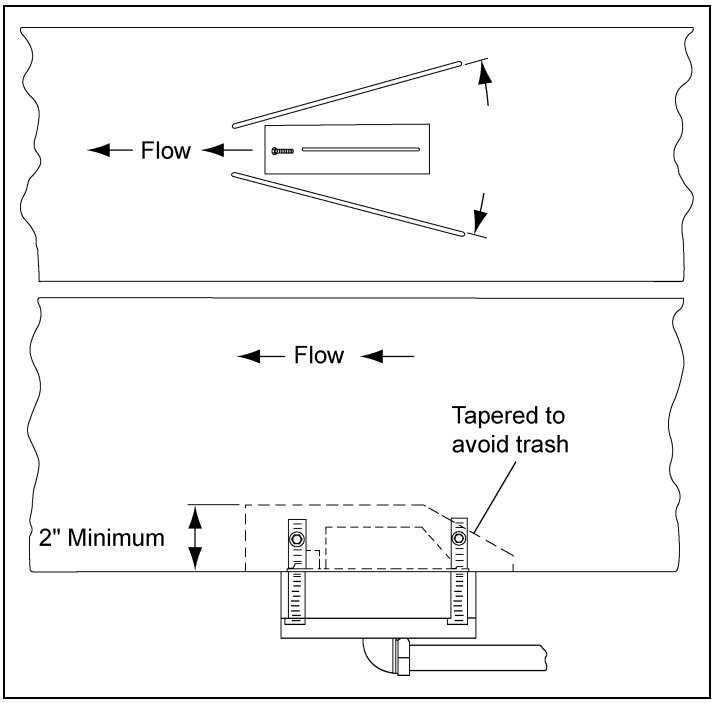


Figure 3J *Side View*

4. Secure the sensor by cutting the end off of the worm gear strap and mounting it with a self-drilling screw to edge of the flat spout. Attach the screw end of the clamp on the other side of the flat spout with a self-drilling screw.

Sensor Installation for TopDry Bins

1. Assemble the sensor to the TopDry sensor bracket by inserting the sensor into the bracket until the bottom of the sensor is flush with the bracket. Check the decal on the bracket and make sure that the sensor blade is positioned correctly. Use the four screws that are taped to the bracket to secure the sensor to the bracket.
2. The sensor assembly should be placed in a position that will allow it to be exposed to the average drying conditions of the batch as it goes through the drying process. It should be mounted so that grain samples can be taken close to the sensor blade for calibration purposes. The sensor should be mounted to the outer ring of baffles with the blade exposed to the center of the bin. Mount the bracket using the slots in the mounting flange so that the center of the sensor is approximately 12" above the drying floor.
3. It is possible to have up to three sensors connected to the monitor. When using more than one sensor, vary the mounting depth. **For example:** When using three sensors, they could be mounted 120º apart and at depths of 10", 12" and 14" above the drying floor. See dip switch setting *on Page 28* when more than one sensor is used. *(See Figure 3K.)* See electrical installation *on Page 19* for the required modifications.
4. On continuous units, it is important that the sensor is located in the path of moving grain which is just above the chute opening. See below *Figure 3K* for sensor mounting.

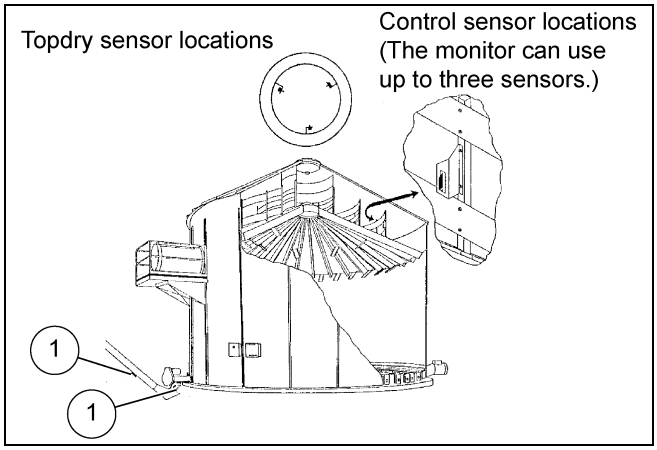


Figure 3K

Ref #	Description
1	Possible Discharge Sensor Locations

Continuous Flow TopDry

On continuous flow TopDry, the sensor should be mounted up-stream from a chute opening. Make a new bracket to mount the TopDry sensor bracket (602N173), as shown in *Figure 3L*.

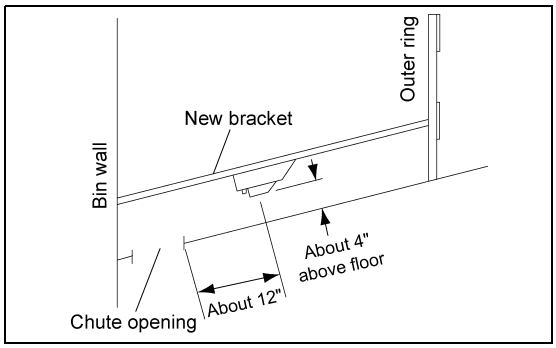


Figure 3L

Sensor Installation in Grain Columns

1. Assemble the sensor to the column sensor housing by inserting the sensor into the housing until it is flush with the bottom. Check the decal on the sensor housing to make sure that the blade is oriented properly. Insert the cross bar with the thumb screw into the slots on each side of the housing. Check to make sure that the sensor is still flush with the bottom and tighten the screw.
2. The sensor and column housing is intended to be mounted in a column of drying grain. It should be mounted in the column area just above where cooling begins for continuous-batch-dump dryers and centered in the dryer column for automatic batch dryers. Cut a 4-1/2" x 13-1/4" hole in the side of the column and insert the housing and sensor assembly. Use six self-tapping screws to secure the flanges of the housing the column side sheet. *(See Figure 3M.)*

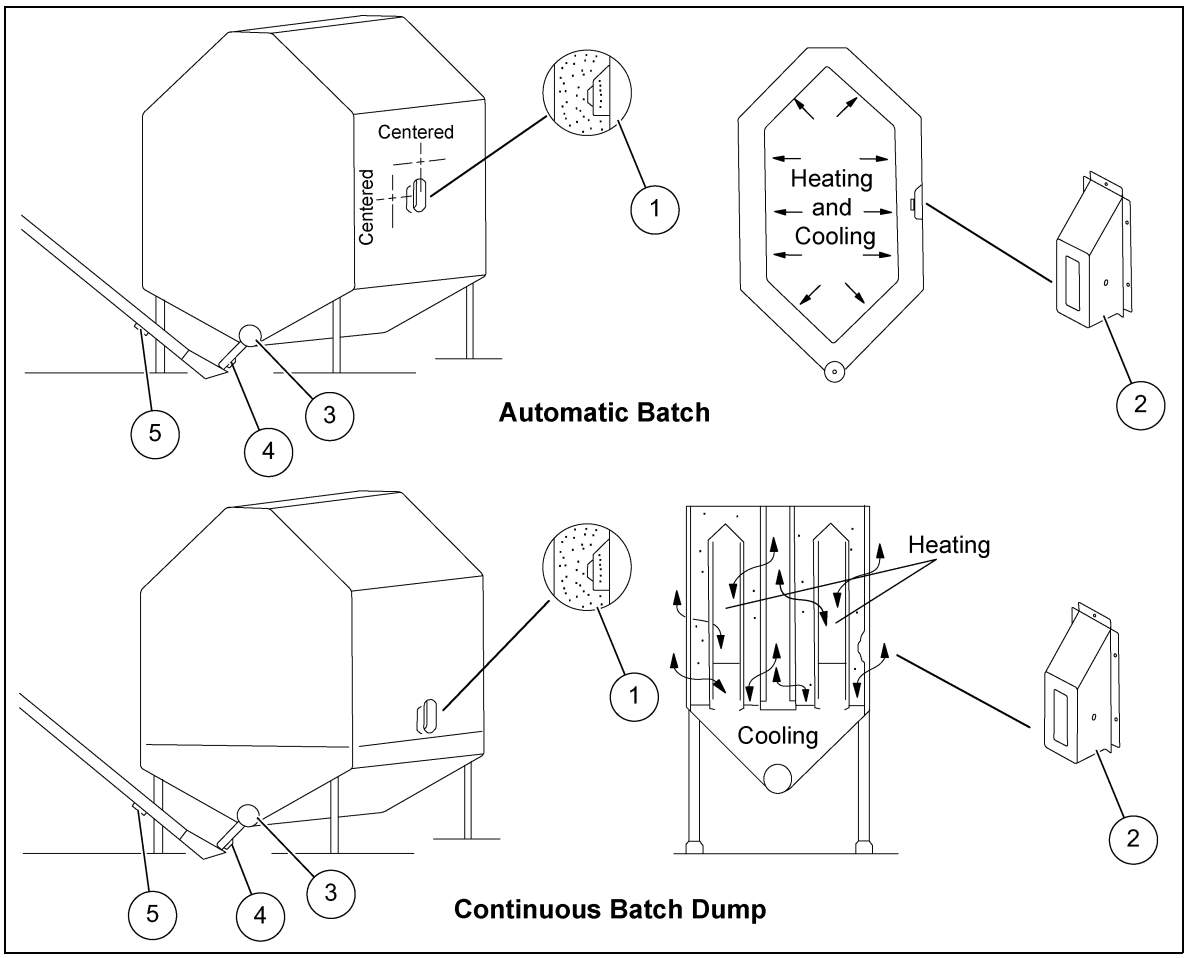


Figure 3M

Ref #	Description
1	Control Sensor
2	Column Sensor Mounting Kit (602N175)
3	Typical sensor location in discharge auger.
4	Use a funnel type of restrictor to ensure grain moves over sensor blade.
5	Typical sensor location in take-away auger.

3. Continuous flow type dryers that cool the dried grain before it is discharged from the dryer should have a sensor and column housing installed in the side panel of the dryer. Center the sensor housing just above the cooling area. *(See Figure 3M on Page 17.)*

4. Continuous flow dryers that discharge the dried grain hot should install the sensor in one of the three locations in the discharge area. See the possible discharge sensor locations in. *(See Figure 3M on Page 17.)*

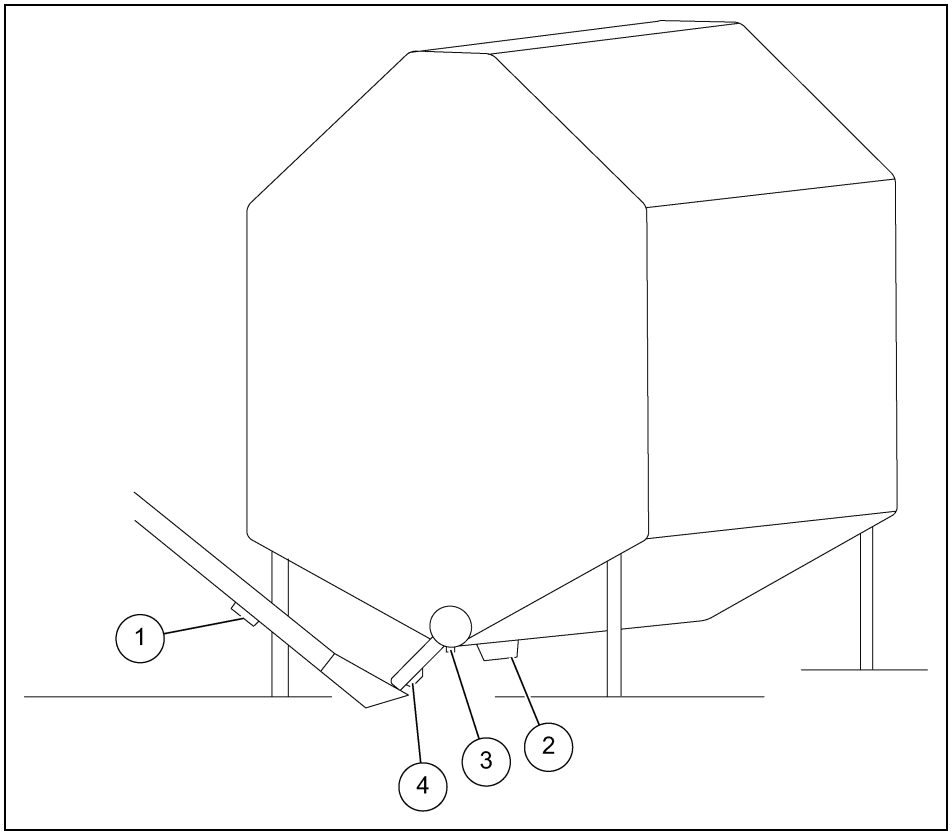


Figure 3N *Continuous Flow Dryer*

Ref #	Description
1	Take-Away Auger (Inclined, Horizontal or Vertical)
2	Discharge auger, at clean out door near outlet.
3	Discharge Auger Extension
4	Discharge Chute, Refer to *Figure 3J*.
5	Column, Refer to *Figure 3M*.

Sensor Installation for Electrical and Sensor Hook-Up

1. Mount the moisture monitor control box in a location that will be convenient to observe and is free of vibration. (**NOTE: *Locate within 25' of the sensor*** *due to cable lengths.*)

2. Route the five wire sensor cable through the one-half 1/2" liquid-tight conduit to the moisture monitor box. Attach the sensor wires to the five terminals marked “Sensor” in the upper left corner in the back of the box. Connect each wire to match the color marked on the terminal decal. When using more than one sensor, connect all of the matching colored wires as described above. Refer to the dip switch chart *on Page 28*. Set switches 9 and 10 to the correct position according to the number of sensors.

   NOTE: *The top terminal strip is low voltage DC never hook AC power to this strip.*

3. The moisture monitor requires 115 Volts AC to operate. Bring AC power in on the right side of the box and wire it to the terminals identified by the decal (L1, N and GND).

4. Signal Out 1 and Signal Out 2 are located on the lower right terminal strip and identified by a decal. Each signal consists of “C” (common), “NO” (normally open) and “NC” (normally closed). The relay contacts are rated at 5 amps 115 VAC.

   If your application is TopDry system, move the yellow wire with the tag attached from terminal 10 to terminal 12. Use the “NO” and “C” output to signal the burner. “NO” and “C” will close when moisture is below set point. If your application is to signal when the moisture increases above the moisture limit, leave the yellow wire on terminal 10. “NO” and “C” will close when moisture is below set point. The auto-off-manual switch must be in automatic for this operation.

5. If Signal Out 1 or 2 is used to control any other equipment, make sure that all safety switches on your dryer remain functional after the wiring is completed. The relay contacts are rated at 5 amps 115 VAC.

Never apply AC voltage to the upper sensor terminal strips.

All wiring must be done in accordance with the electrical code.

To avoid possible bodily injury and death. All wiring should be done by a qualified electrician and should be to all code standards.

Grain bins and/or dryers with electrical equipment in operation must be grounded.

Do not modify or bypass any safety shut offs.

Operation

1. The moisture monitor will read the moisture when in either the AUTOMATIC or MONITOR position. Signal Out 1 and 2 will operate only in the AUTOMATIC position. (The digital display should read approximately 6.0% when the sensor is in open air.)

2. Push the paddle switch up to the “DISPLAY TEMPERATURE” position and the display will show the temperature of the grain on the sensor.

   Push the paddle switch down to “DISPLAY CALIBRATION” and the display will show the amount added to or subtracted from the displayed moisture (-9.9 to +9.9).

3. The moisture set point is adjusted by turning the set point knob while holding the display set point paddle switch down. Turning the knob clockwise will increase the moisture set point and counterclockwise will decrease the moisture set point (0 to 25).

4. The moisture monitor may need to be calibrated to compensate for different grains and sensor configurations. Make sure that the calibration is set at zero before comparing the displayed moisture values with the samples tested with a reliable moisture tester. See *Chat on Page 21*, Calc-U-Dri moisture sampling.

   a. If the displayed moisture value is less than from a moisture tester, push the “Display Calibration” and turn the calibration knob to display the actual difference (+ value).

   b. If the displayed moisture value is more than from the moisture tester value, push the “Display Calibration” and turn the calibration knob to display the actual difference with a minus sign (- Value).

Use a safe sampling procedure. Do not sample from a hopper with an unguarded auger. Keep hands, feet and clothing away from rotating parts.

   c. The following sampling guidelines are recommended:

   - Take samples when the displayed moisture values are not changing rapidly.
   - Observe the moisture display when the sample is taken. Record both the displayed values and tested values for at least six samples and take the average of each.
   - Take samples close to where the sensor is located. A special sampling discharge may have to be installed in some cases.

The chart below shows grain moisture readings (from an actual situation) as they should be taken to obtain a realistic moisture value.

Calc-U-Dri Moisture Monitor Sampling

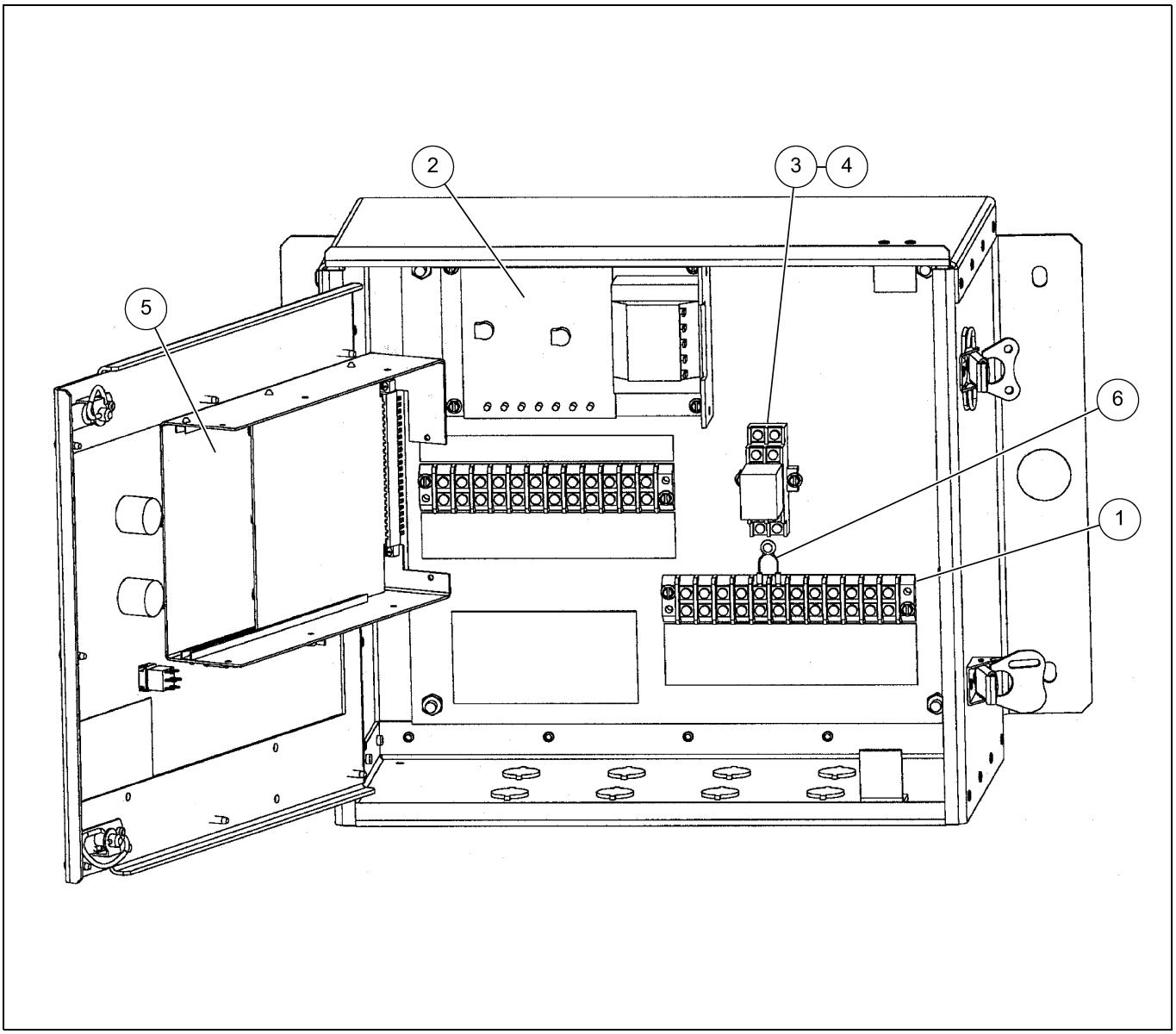
	Calc-U-Dri		Dole		Elevator
Time	**Temperature**	**Moisture**	**Temperature**	**Moisture**	**Moisture**
9:33 AM	112	14.4%	109	14.7%	
9:36 AM	112	14.4%	111	14.4%	
9:38 AM	108	16.0%	107	17.5%	
9:40 AM	110	14.6%	109	14.7%	
9:43 AM	108	15.9%	104	17.3%	
9:50 AM	111	14.5%	107	15.0%	
Total		**89.8%**		**93.6%**	
Average		**15.0%**		**15.6%**	**15.3%**

Question: Where would you set the moisture offset, +0.3 or +0.6?

Answer: Most would want to set it to +0.3 which would make it match the point of sale's moisture reading.

- The chart recorder option is available for use with moisture monitor. It will record moisture information continuously when it is in either the AUTOMATIC or MONITOR position.
- The printer option is available. The grain moisture, grain temperature and average moisture is printed at an interval that is between 2 minutes and 30 minutes. The print cycle will repeat as long as power is applied.

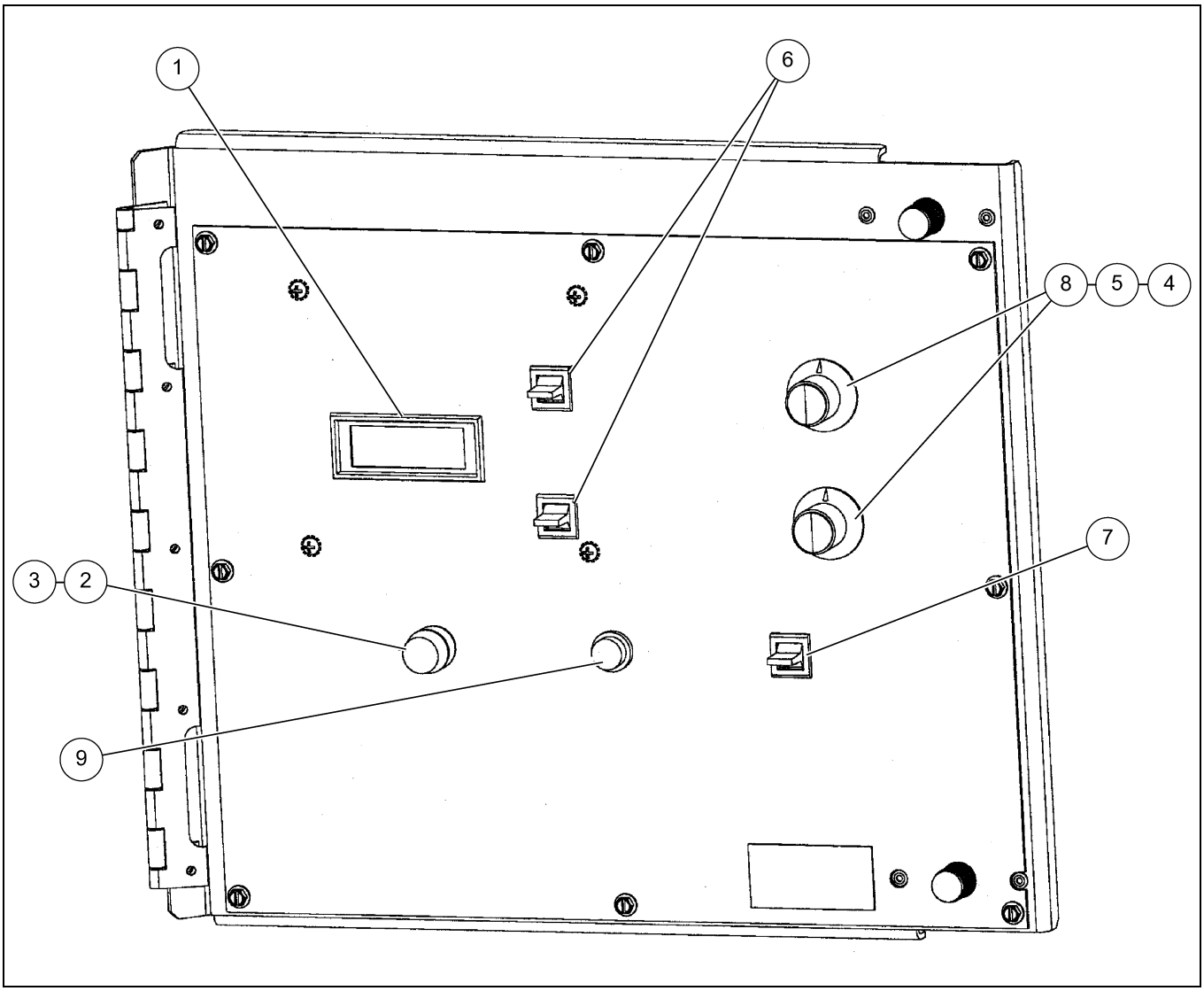
Monitor I - Control Box



Monitor I - Control Box Parts List

Ref #	Part #	Description	Qty
1	1EL0900	Connector, Terminal Block 12P 30A 300V CSA Marathon at 671 RZ 12 3765	2
2	5041375	Power Supply - Monitor I Assembly (M/F 2EL0213)	1
3	2EL0274	Relay, DPDT 12 VDC (CSA) Omron #LY2-DC12 or Equiv. CSA	1
4	2EL0275	Relay, Socket, DPDT (CSA) IDEC#SH2B02 10A 300 VAC	1
5	602E460	Circuit Board - GSI 18	1
6	602E430	Surge Absorber - Assembly with Terminals	1

Monitor I - Control Module



Monitor I - Control Module Parts List

Ref #	Part #	Description	Qty
1	5041198	Digital Panel Meter Kit	1
2	1EL0719	Fuse - AGC, 2 Amp, 250 Volt	1
3	1EL0826	Fuse Holder	1
4	1EL0921	Knob, Control Black	2
5	1EL2042	Rubber Grommet	2
6	2EL0658	Switch, LVR, SPDT ON-OFF-ON	2
7	2EL0669	Switch, LVR, DPDT ON-OFF-ON	1
8	2EL0672	Potentiometer, 10K Ohm	2
9	2EL1161	Light - Indicator, Red (CSA) (IDI #1050QCI)	1

Sensor Assembly (602E020)

Sensor Assembly (Part # 602E020) Parts List

Part #	Description	Qty
1EL3045	1/2" Liquid-Tight	
MS0359	Worm Gear Clamp	
602E217	Sensor Hole Template	1
3FH1213	Outer Door Latch	1
602N117	Sensor Cable Extension Kit	1
602N126	6" Connecting Band Kit	1
602N175	Column Sensor Kit	1
603N020	8" Connecting Band Kit	1
602D140	Restrictor Funnel	1
1EL3039	5 Wire Sensor Cable	

NOTE: *Parts not shown on monitor I control box and control module drawings Pages 22 and 23.*

Problem	Probable Cause	Solution
1. Moisture readings do not change, temperature readings are high negative.	1. Sensor leads are broken or not hooked onto the terminal. 2. Sensor trouble.	1. Tighten terminal screws or replace the sensor. 2. Replace the sensor.
2. Moisture readings are intermittently high then low.	1. Check for the sensor ground strap not hooked up. 2. Sensor cable leads broken. 3. Loose terminal leads where Sensor is hooked.	1. Hook-up strap. 2. Replace the sensor. 3. Tighten the screws.
3. Moisture readings are consistently high or low.	1. Correct by calibration adjustment, refer to control box definitions.	1. Adjust
4. Blowing control fuses.	1. Check surge absorber for signs of smoke. 2. Check for loose or shorted leads. 3. Any component that is bad can cause this - check by isolating one component at a time.	1. Replace if damaged. 2. Isolate and correct. 3. Replace bad component.
5. Chart recorder does not work.	1. Power switch OFF on chart recorder. 2. Signal leads crossed. 3. Defective recorder.	1. Turn on switch ON back of chart recorder. 2. Replug correctly. 3. Replace
6. Chart recorder paper jams.	1. Heater strip not working. 2. Paper installed wrong.	1. Replace heater strip. 2. Reference recorder manual on paper changing.
7. Chart recorder pegs the needle.	1. Signal to recorder is crossed. 2. Control card not set correctly.	1. Switch wires on the rear. 2. Refer to *Page 28* and check DIP switch 7 and 8.

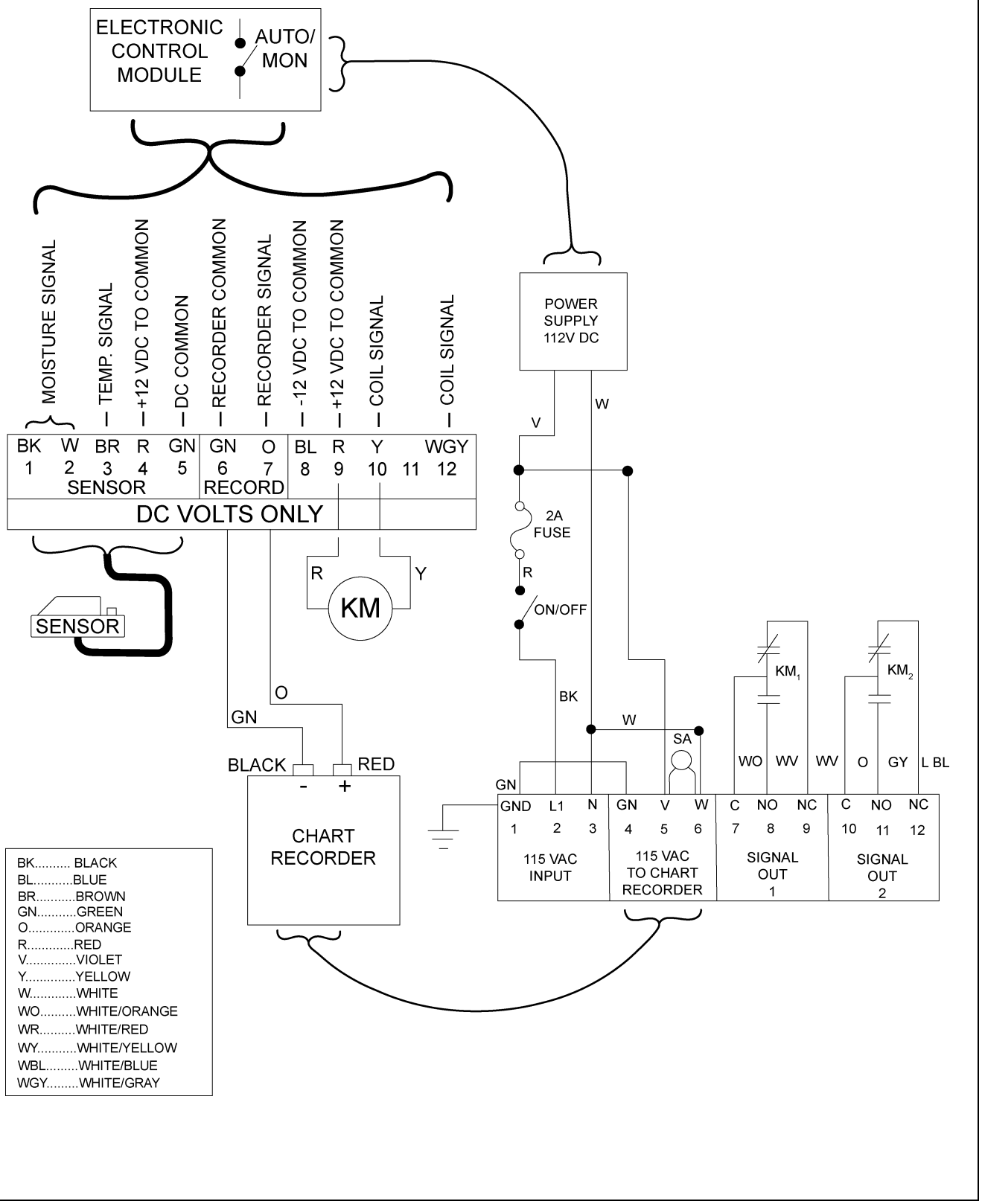
NOTE: *1. Never unplug or plug in the circuit board with power "ON".*

2. Do not make field adjustments on the circuit board. This is a factory adjustment only.

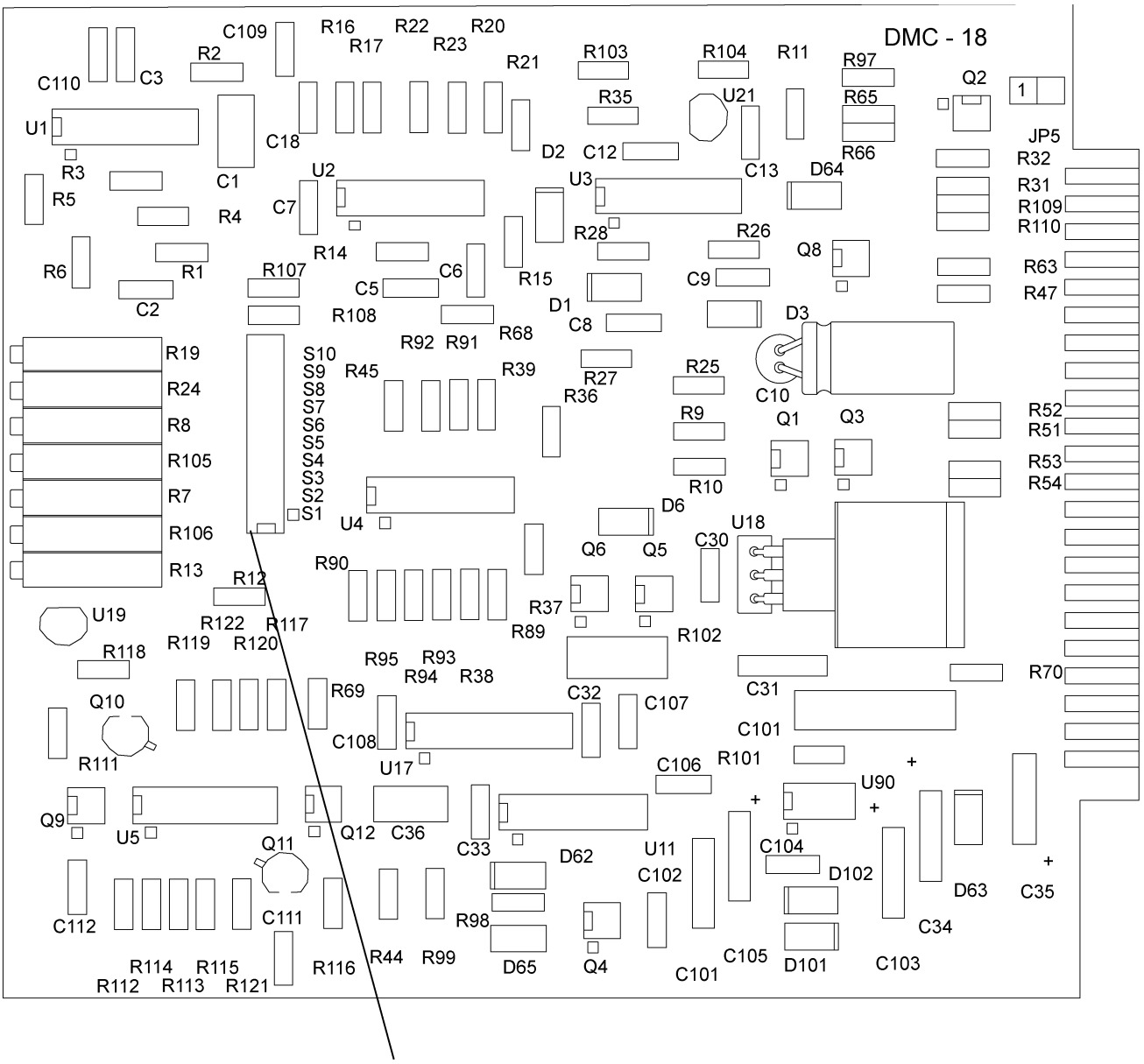
3. Contact your dealer or GSI if you have any questions on the service of your GSI Calc-U-Dri Moisture Monitor.

Take time for proper installation, It saves service calls.

Wiring Diagram for AC Calc-U-Dri Monitors



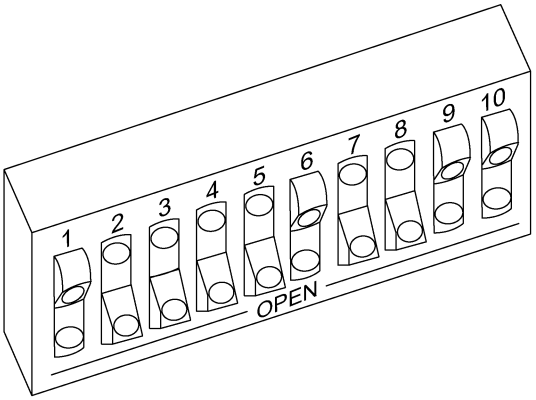
GSI 18 Circuit Board (602E460)



See chart *on Page 28* for dip switch correct setting.

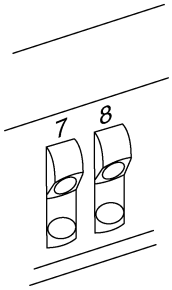
Dip Switch Settings (For (602E460) GSI 18 Board)

With one sensor
with or without chart recorder



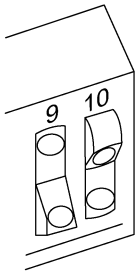
1 - Open
2 - Closed
3 - Closed
4 - Closed
5 - Closed
6 - Open
7 - Closed
8 - Closed
9 - Open
10 - Open

With printer



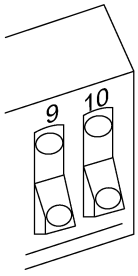
7 - Open
8 - Open

With two sensors
(Will average moisture and temperature of both sensors.)



9 - Closed
10 - Open

With three sensors
(Will average moisture and temperature of all three sensors.)



9 - Closed
10 - Closed

GSI Group, LLC Limited Warranty

The GSI Group, LLC ("GSI") warrants products which it manufactures to be free of defects in materials and workmanship under normal usage and conditions for a period of 12 months after sale to the original end-user or if a foreign sale, 14 months from arrival at port of discharge, whichever is earlier. The end-user's sole remedy (and GSI's only obligation) is to repair or replace, at GSI's option and expense, products that in GSI's judgment, contain a material defect in materials or workmanship. Expenses incurred by or on behalf of the end-user without prior written authorization from the GSI Warranty Group shall be the sole responsibility of the end-user.

Warranty Extensions:

The Limited Warranty period is extended for the following products:

	Product	Warranty Period
AP Fans and Flooring	Performer Series Direct Drive Fan Motor	3 Years
	All Fiberglass Housings	Lifetime
	All Fiberglass Propellers	Lifetime
AP and Cumberland	Flex-Flo/Pan Feeding System Motors	2 Years
Cumberland Feeding/Watering Systems	Feeder System Pan Assemblies	5 Years **
	Feed Tubes (1-3/4" and 2.00")	10 Years *
	Centerless Augers	10 Years *
	Watering Nipples	10 Years *
Grain Systems	Grain Bin Structural Design	5 Years
Grain Systems Farm Fans Zimmerman	Portable and Tower Dryers	2 Years
	Portable and Tower Dryer Frames and Internal Infrastructure †	5 Years

* Warranty prorated from list price:
0 to 3 years - no cost to end-user
3 to 5 years - end-user pays 25%
5 to 7 years - end-user pays 50%
7 to 10 years - end-user pays 75%

** Warranty prorated from list price:
0 to 3 years - no cost to end-user
3 to 5 years - end-user pays 50%

† Motors, burner components and moving parts not included. Portable dryer screens included. Tower dryer screens not included.

GSI further warrants that the portable and tower dryer frame and basket, excluding all auger and auger drive components, shall be free from defects in materials for a period of time beginning on the twelfth (12^{th}) month from the date of purchase and continuing until the sixtieth (60^{th}) month from the date of purchase (extended warranty period). During the extended warranty period, GSI will replace the frame or basket components that prove to be defective under normal conditions of use without charge, excluding the labor, transportation, and/or shipping costs incurred in the performance of this extended warranty.

Conditions and Limitations:

THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE LIMITED WARRANTY DESCRIPTION SET FORTH ABOVE. SPECIFICALLY, GSI MAKES NO FURTHER WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE IN CONNECTION WITH: (I) PRODUCT MANUFACTURED OR SOLD BY GSI OR (II) ANY ADVICE, INSTRUCTION, RECOMMENDATION OR SUGGESTION PROVIDED BY AN AGENT, REPRESENTATIVE OR EMPLOYEE OF GSI REGARDING OR RELATED TO THE CONFIGURATION, INSTALLATION, LAYOUT, SUITABILITY FOR A PARTICULAR PURPOSE, OR DESIGN OF SUCH PRODUCTS.

GSI shall not be liable for any direct, indirect, incidental or consequential damages, including, without limitation, loss of anticipated profits or benefits. The sole and exclusive remedy is set forth in the Limited Warranty, which shall not exceed the amount paid for the product purchased. This warranty is not transferable and applies only to the original end-user. GSI shall have no obligation or responsibility for any representations or warranties made by or on behalf of any dealer, agent or distributor.

GSI assumes no responsibility for claims resulting from construction defects or unauthorized modifications to products which it manufactured. Modifications to products not specifically delineated in the manual accompanying the equipment at initial sale will void the Limited Warranty.

This Limited Warranty shall not extend to products or parts which have been damaged by negligent use, misuse, alteration, accident or which have been improperly/inadequately maintained. This Limited Warranty extends solely to products manufactured by GSI.

Prior to installation, the end-user has the responsibility to comply with federal, state and local codes which apply to the location and installation of products manufactured or sold by GSI.

9101239_1_CR_rev8.DOC (revised January 2014)

This equipment shall be installed in accordance with the current installation codes and applicable regulations, which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.

1004 E. Illinois St.
Assumption, IL 62510-0020
Phone: 1-217-226-4421
Fax: 1-217-226-4420
www.gsiag.com

Your Agriculture Company

GSI is a worldwide brand of AGCO Corporation.

Printed in the USA

CN-332213