

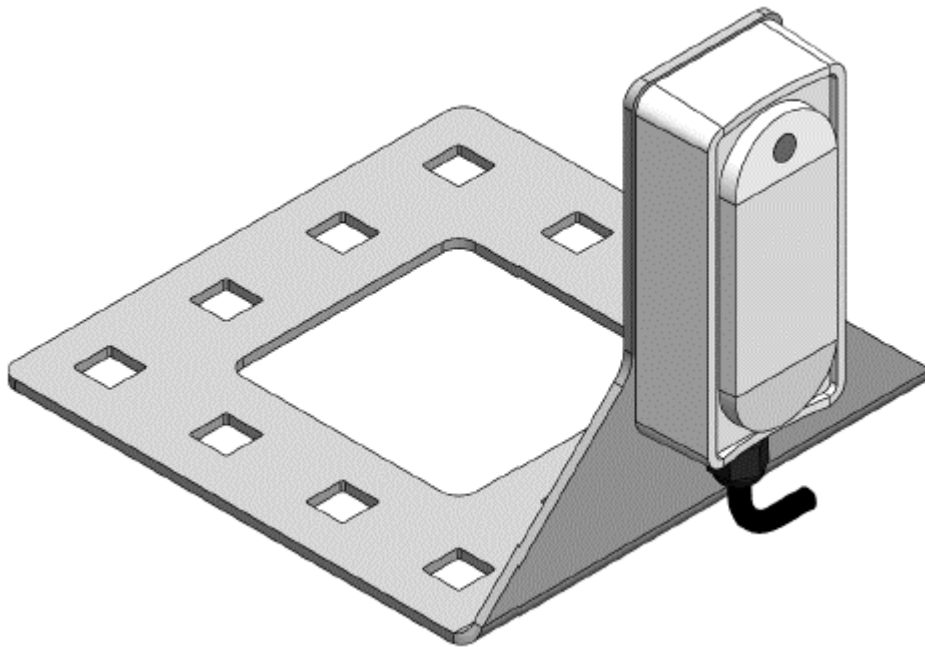


Grain

Moisture Sensor

Installation and Calibration

for GT560 Scale Indicator



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D4172-EN Moisture Sensor Rev A LCC

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1.0 INTRODUCTION

Thank you for purchasing the Digi-Star Moisture Sensor. This manual provides guidelines on installation as well as procedures for calibrating the Moisture Sensor. By following these guidelines and procedures accurate grain moisture readings are possible.

This manual only covers installation and procedures for use with the Digi-Star GT560 Scale Indicator.

This manual covers the installation and calibration of the **410422 Moisture Sensor** and components. The sensor has several installation options covered in this manual.

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1.1 LIMITATIONS

The installation portions of this manual are intended to be used by the Original Equipment Manufacturer (OEM) as a guideline to determine the best location for mounting the Moisture Sensor.

For aftermarket installations the OEM of the grain cart or wagon should be contacted for information pertaining to the most suitable location for installation of the Moisture Sensor, and specific instructions for installing the Moisture Sensor in a particular Grain Cart or Weigh Wagon.

This manual is not intended to be used as the sole guide and instruction for aftermarket installations of the Grain Moisture Sensor in the field.

The Moisture Sensor must be installed where there is consistent, even grain flow, across the sensor when unloading the grain cart or weigh wagon.

1.2 REFERENCES

D4168-EN GT560 Operations Manual
 D3908-EN AutoLog Manual
 D4055-EN EZIV Technical Manual

Digi-Star website: www.digi-star.com

Technical Support: Toll Free 800-225-7695 (US & Canada); +1-920-563-9700

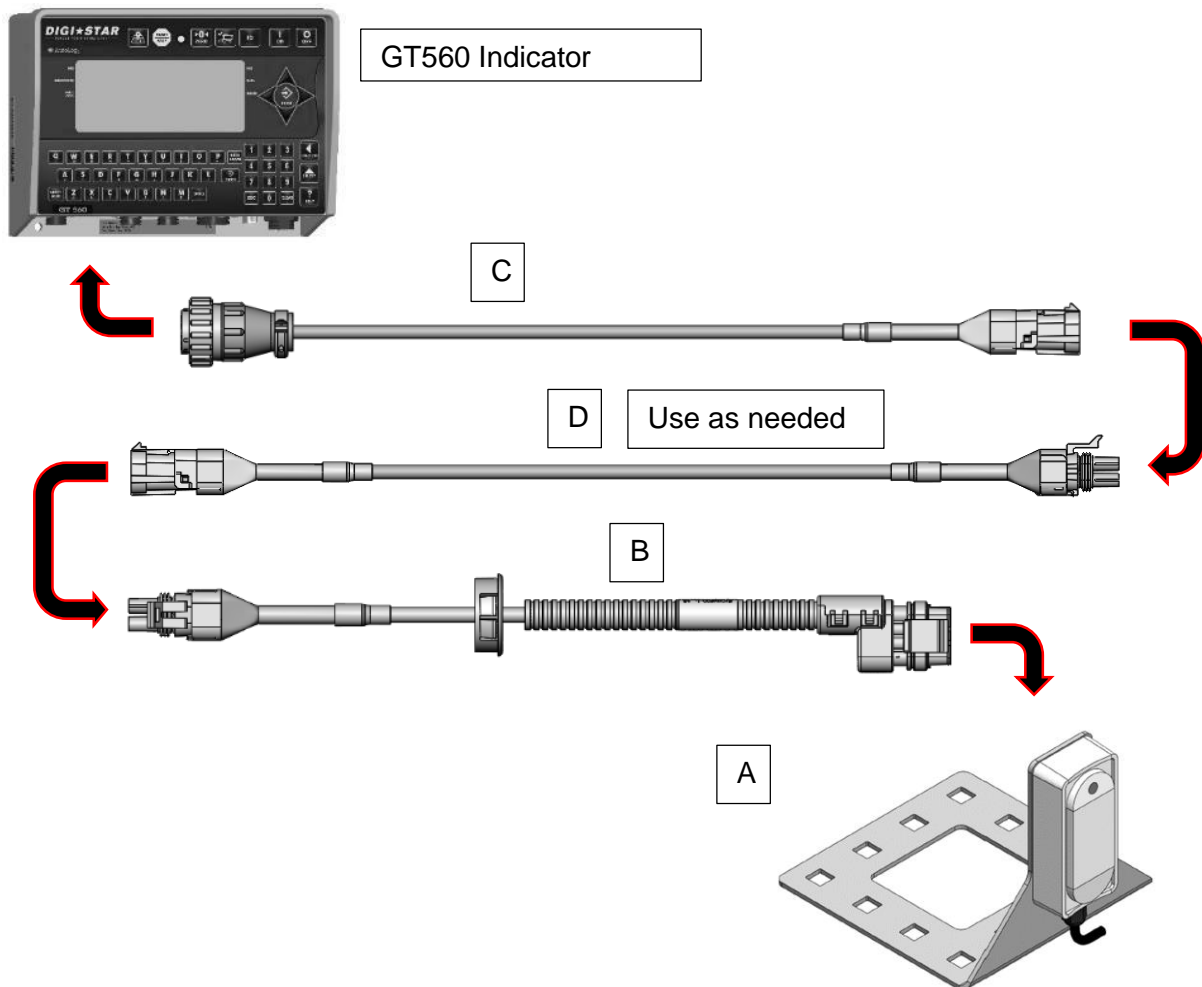
1.3 CONNECTIONS - PACKARD/ DELPHI:

4 pin WP	Sensor Cable (black conduit)	Extension & Indicator Cables
A	Red	Red
B	Yellow	White
C	Green	Green
D	Blue	Black

2.0 SYSTEM CONTENTS & OVERVIEW

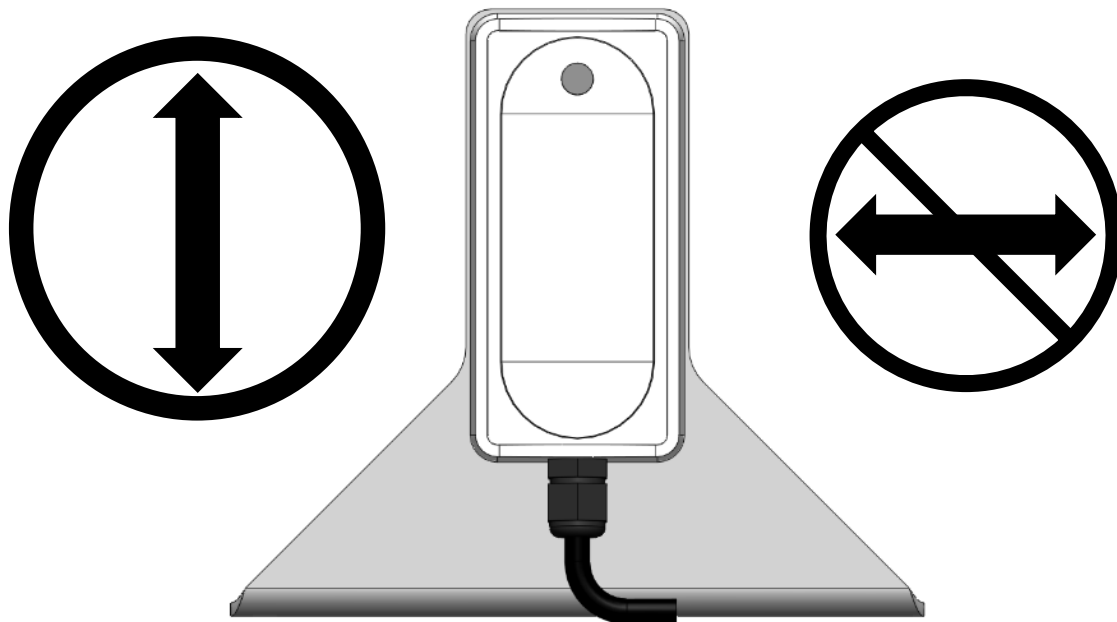
PN: 410422 PACK-GT560 MOISTURE SENSOR

	Description	Part Number	Quantity
A	Assy-Moisture Sensor	410289	1
B	Cable-Moisture Sensor In-Cart	410344	1
C	Cable-Moisture To Indicator	410345	1
D	Cable-25' Wp 4pin Extension	410386	1
	Hose Clamp 1/2"X2" #24	407451	4
	Hose Clamp 11/16"X1-1/4" #12	410423	4
	Cable Tie-.14x11.625"	PS2144	30
	Cable Tie Holder	6000109	10
	Template-Moist Snsr Door	SDC50010700	1



3.0 GENERAL INSTALLATION GUIDELINES

- ✓ Read all instructions and options before beginning installation.
- ✓ It is usually easiest to work from the Sensor forward to the hitch, then from the GT560 back to the hitch and meet in the middle.
- ✓ **Sensor must be mounted in a location where there is consistent grain flow while unloading.** This location is usually above the unload doors inside a grain cart. Knowledge and observation of how the grain flows in specific cart, wagon, or box is required to determine the most suitable mounting location.
- ✓ It is important that grain flows across the Sensor in the first few seconds during unloading, and that grain flow continues for at least 50% of the unloading period.
- ✓ Always try In-Cart installations first. In-Cart installations allow changes to the position of the sensor position if needed. Installations that require cutting away metal should only be utilized when In-Cart installations do not provide satisfactory results.
- ✓ Grain must flow by Sensor in order for the Sensor to function. If grain flow stops flowing over the Sensor during unloading, the GT560 automatically stops recording moisture.
- ✓ The Sensor only reads grain flow along the length of the Sensor as shown below. Sensor does not read grain flow across the Sensor.



3.1 INSTALLATION – GT560 / TRACTOR SIDE

- 1) Install the GT560 Indicator in the tractor cab per manual supplied with the GT560.
- 2) Install Power & AutoLog , Load Cell, and Accessory Cabling as required.
- 3) Make sure that GT560 powers on without errors.
- 4) Connect Grain Moisture Sensor cable with 16 pin connector to ACC port on GT560 Indicator.
- 5) Route cable out to rear of tractor.
 - a. Standard tractor (cab over rear axle)



- i. Cable(s) may go out rear window through lower seal or flexible conduit.
- ii. On this tractor type, it is most common to use the GT560 as the implement disconnect point for the cabling.

- b. Articulating/ large tractor



- i. Cable(s) should go through the tractor's supplied wiring ports and routing locations, or through similar access points.
- ii. All cabling must be installed so that it is not pulled or crushed with the tractor's normal use and movement.
- iii. Cable disconnects work best when placed near the other harness and hose hookups. The moisture cable is designed to reach this location.

- 6) Go to next section(s) to install Sensor and Cabling on Cart or Wagon.

3.2 INSTALLATION – MOISTURE SENSOR IN-CART

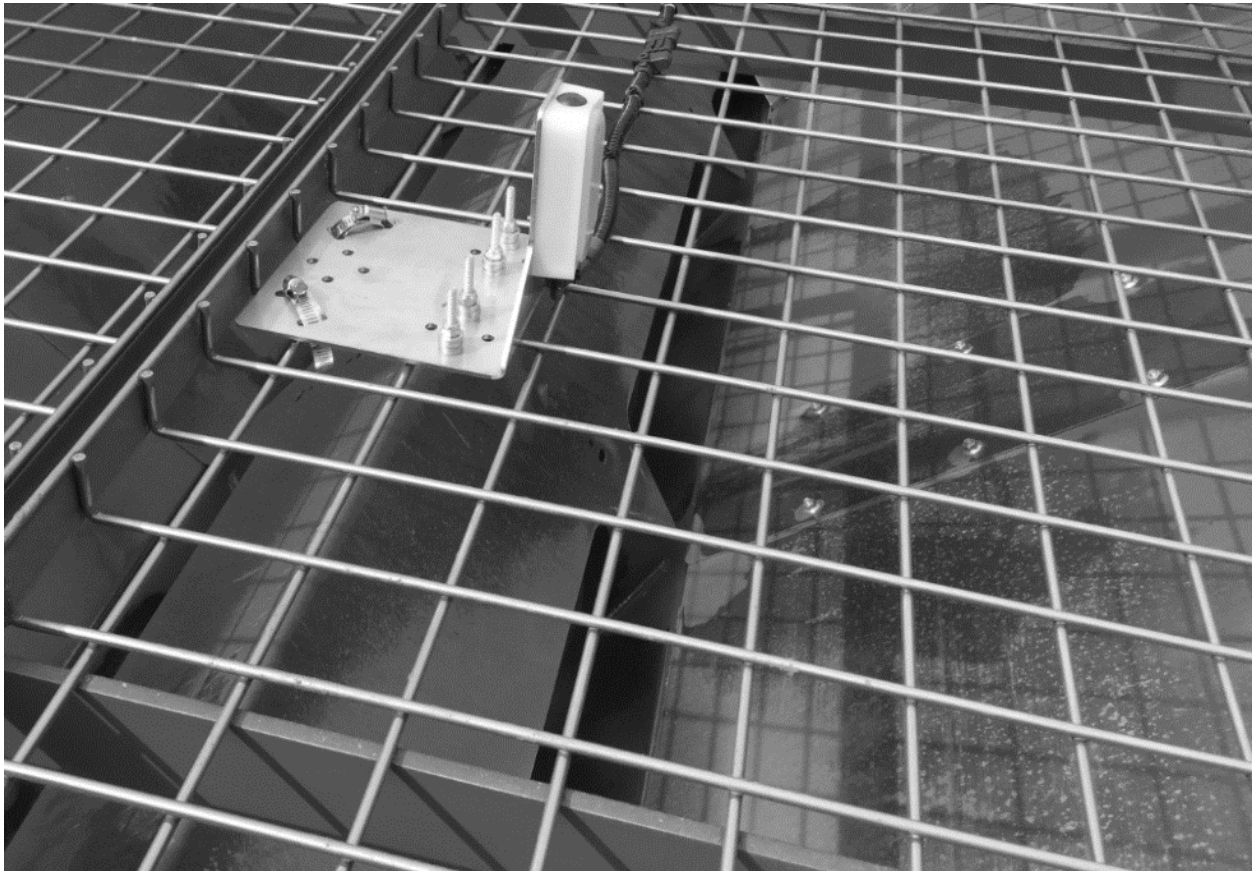
Typical mounting is attachment to the safety grating inside the body. Performance is best when the sensor reads consistent flow of grain during at least the first 50% of unloading. This installation method allows the sensor to be repositioned to improve performance as needed.

The most suitable location is either on top of, or under, the safety grating, just above the unloading shutter openings, about 1/3 to 1/2 of the way back from the front of the body. Sensor should be kept within 18 inches or less above the shutter opening, in the lower “V” portion of the cart. Mounting the sensor under the grating may help get the sensor closer to the shutter and extend sensing time. A good starting point is to mount the white sensor face directly above the shutter edge when the shutter is ¼ open.

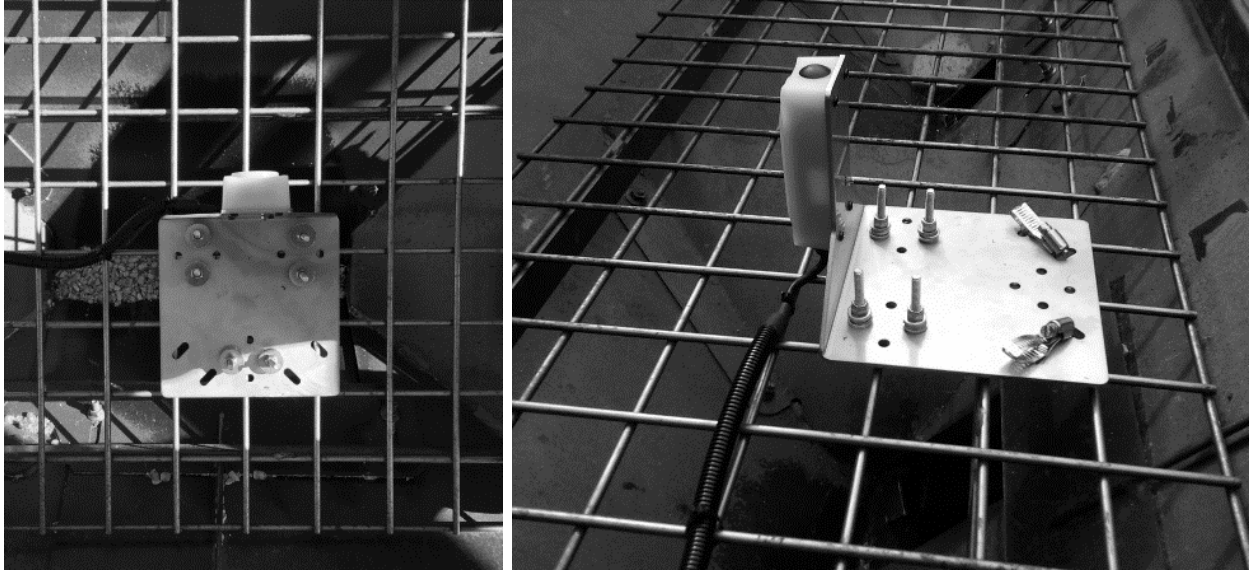
- 1) Review pictures on next two pages.
- 2) Identify a location that provides initial consistent grain flow for Sensor placement.
- 3) Remove the smaller bracket and set aside.
- 4) Install Moisture Sensor with large bracket on grating with hose clamps, or use other secure hardware. Mounting can be on top or bottom side as shown in pictures, next page.
- 5) Identify routing for Moisture Sensor cable to exit the tank. Install by:
 - a. Drilling 1-1/4” hole in upper apron or tank, protect with supplied grommet.
 - b. Cable routing preferences:
 - i. Route cable from Moisture Sensor per grain cart manufacturer or dealer’s instructions.
 - ii. Install cabling from Moisture Sensor in conduit to exit location.
 - iii. Route Moisture Sensor cable over top of apron or grate, protecting the cable from moving parts and edges.
 - iv. Other custom installation as long as cable is protected.
- 6) Remove all cable slack from inside of cart. Extra cable should be removed or coiled outside of the tank.
- 7) If Moisture Sensor cabling is not run in conduit, secure cabling inside the hopper with zip ties every few inches, starting at the Sensor (options a. & b.) and moving toward cable exit from tank. Cable should be routed along or under a heavy grate rail if possible. Cable should never be left unsupported or unsecured to prevent damage to the cable and Moisture Sensor.

- 8) Plan final cable routing out of the front to hitch to connect the Moisture Sensor to the GT560. Use the Extension Cable as needed on larger carts and tractors.
- 9) Secure remaining cable with zip ties, avoiding moving parts such as the auger when it is raised and lowered, as well as the PTO shaft.
- 10) Test sensor to verify it is working; see **Moisture Sensor Test** section.

Example: Top Grate Mount #1



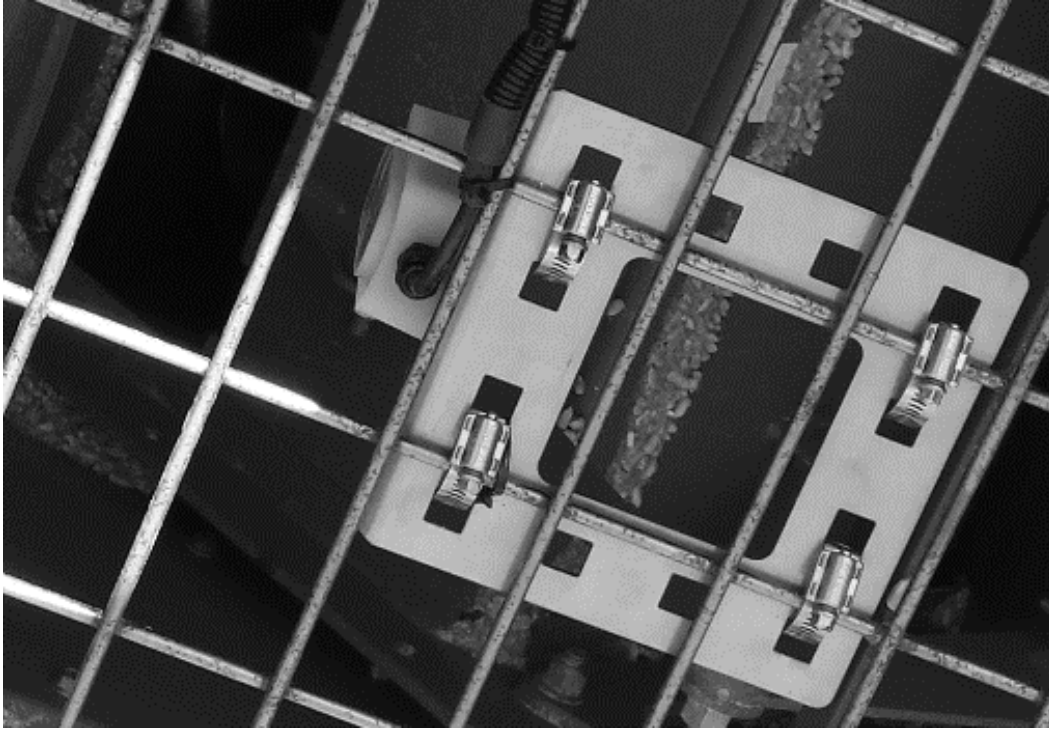
Example: Top Grate Mount #2



Example: Under Grate Mount #1



Example: Under Grate Mount #2



3.3 INSTALLATION – AUGER CLEANOUT DOOR

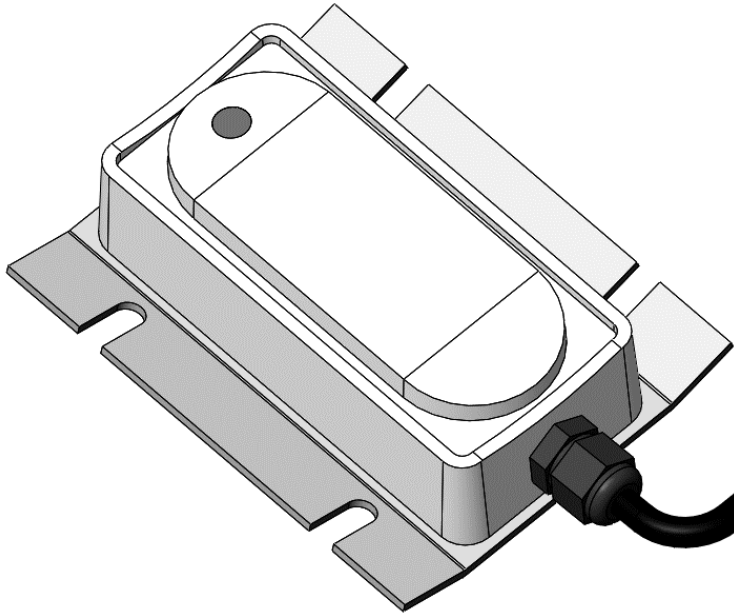
This mounting style consists of installation on the unloading auger cleanout door. A hole is cut in the door using the supplied template and the Moisture Sensor is mounted to the outside of the door. This mounting method does not work on all carts, as it depends on the cart design.

When considering this mounting method, 5 things must be evaluated with the cleanout door removed. Steady grain flow must be against the cleanout door for this installation method to work. If the answer is NO to any of these questions, a different installation location should be investigated.

1. Is the unloading auger flighting visible, and starts near the bottom of the cleanout door?
2. Does the unloading auger flighting movement pass grain against the door?
3. Has grain flow worn a clean spot in the paint on the door?
4. Will the Moisture Sensor, once mounted, stay clear of the auger flighting, door mounting, or other parts?
5. Is the auger a standard shape? Cupped augers or conveyors will not work with this mounting method.

3.4 UNLOADING AUGER INSTALL PROCESS

1. Remove the Moisture Sensor from large bracket & add small bracket. Reconnect internal ground wire. Be careful while handling small grounding wire.



Remove Large
Bracket; Add
Small Bracket

2. Identify location on door to mount the Moisture Sensor. This is best at the top of the door, in the middle of the paint wear as shown.



3. Attach supplied template to door in this location.
4. Before cutting, verify small plate aligns correctly with template holes.
5. Verify mounting will not interfere with any other parts or functions.
6. Cut holes. Drill and cut w/ carbide blade, or use plasma cutter.
7. Mount Moisture Sensor to door, plate on outside with plastic face inside. Bolt heads must be inside door, nuts to the outside. Do NOT overtighten!
8. Plan final cable routing out to hitch, so that Sensor is connected to GT560.
9. Secure remaining cable with zip ties, avoiding moving parts such as the auger when it is raised and lowered, as well as the PTO shaft.
10. Test Sensor to verify it is working; see **Moisture Sensor Test** section.

3.5 INSTALLATION – ALTERNATE OPTIONS

Other options exist for installation of the Moisture Sensor. In every installation, the grain must be flowing against the Moisture Sensor for the sensor to work. This is a brief overview of some other options.

3.5.1 Horizontal Door Install

This installation is for dual auger grain carts only, and will only work on a limited number of carts. The installation process is similar to that of the Unloading Auger Cleanout Door, with the sensor positioned lengthwise. Key items to consider:

- Door must be located on lowest part of auger, not on side.
- Grain flow must be constant in this location while unloading, not in a dead spot.
- Sensor must not interfere with door opening or moving parts.

Example: Horizontal Door Mount



3.5.2 Gravity Unload

This installation is for gravity boxes, carts, wagons, and other gravity or dump style implements that are regularly used for transporting harvested grain. In these systems, the grain is typically dumped out near ground level.

The Moisture Sensor should be installed to read grain as the grain flows and exits the cart, near the lowest point, where grain will flow throughout unloading. The Moisture Sensor can be mounted inside of the cart, or underneath the cart when installed with the supplied template.

NOTE: For carts without a PTO or auger, AutoLog functionality of the GT560 can still be utilized by installing the PTO Sensor as a door position sensor.

See Digi-Star document D3908 AutoLog Manual (Rev F +) for instructions on how to install and setup FSWITCH functionality.









Example: Inside gravity box, by door opening (screws from bottom)



3.5.3 Other Installation Options

Other installation options may be possible that are not described in this manual. Grain must always flow along Moisture Sensor, during at least the first half of the unload process. Contact your dealer, manufacturer, or Digi-Star for other options or assistance.

4.0 MOISTURE SENSOR TESTING








- 1) Verify all cables are connected and GT560 is turned ON.
- 2) GT560 GRAIN type should be set to CORN.
- 3) Test Moisture Sensor operation.
 - a. If WiFi and smartphone Harvest Tracker App are installed:
 - i. Verify App is displaying weight on phone or tablet.
 - ii. Go to Moisture Sensor, so that sensor face is within reach.
 - iii. On App, access keypad function and type “6802” and press . This displays a rough moisture value, usually around 11%. This does NOT read actual grain moisture, and is only for system diagnostics.
 - iv. Place palm of bare hand on sensor face. Value will increase to ~25-35%.
 - v. Press  key on App to exit.
 - vi. Type in “6803” and press . This displays the temperature of the sensor in degrees F, which should be within 10 degrees of air temperature.
 - vii. Press  to exit.
 - viii. Sensor and cabling is operational if these tests are passed.
 - b. If WiFi is not installed:
 - i. Find a second person to help you.
 - ii. Have one person in tractor cab, and the other within reach of the sensor.
 - iii. On GT560, type “6802” and press . This displays a rough moisture value, usually around 11%. This does NOT read actual grain moisture, and is only for system diagnostics.
 - iv. Place palm of bare hand on sensor face. Value will increase to ~25-35%.
 - v. Press  on GT560 to exit.
 - vi. Type in “6803” and press . This displays the temperature of the sensor in F, which should be within 10 degrees of air temperature.
 - vii. Press  to exit.
 - viii. Sensor and cabling are operational if these tests pass.
- 4) Run a couple of loads to calibrate sensor; see section **Moisture Sensor Calibration**.

5.0 MOISTURE SENSOR CALIBRATION

The GT560 Indicator and Moisture Sensor can be calibrated to a reference moisture, such as an elevator, hand held tester, or the combine. There are two ways to adjust the Moisture % Calibration as outlined on the following pages.

5.1 ON-THE-FLY QUICK CALIBRATION















This is the quick method for calibrating the moisture % when setting up each GRAIN type, based on the combine's moisture reading. Grain must be flowing over the sensor while unloading the cart in AutoLog mode to perform this calibration. For the most accurate results and fine tuning, see **Elevator Calibration** section on the next page. Each GRAIN type should be calibrated when that grain is harvested, such as when changing from CORN to SOY.

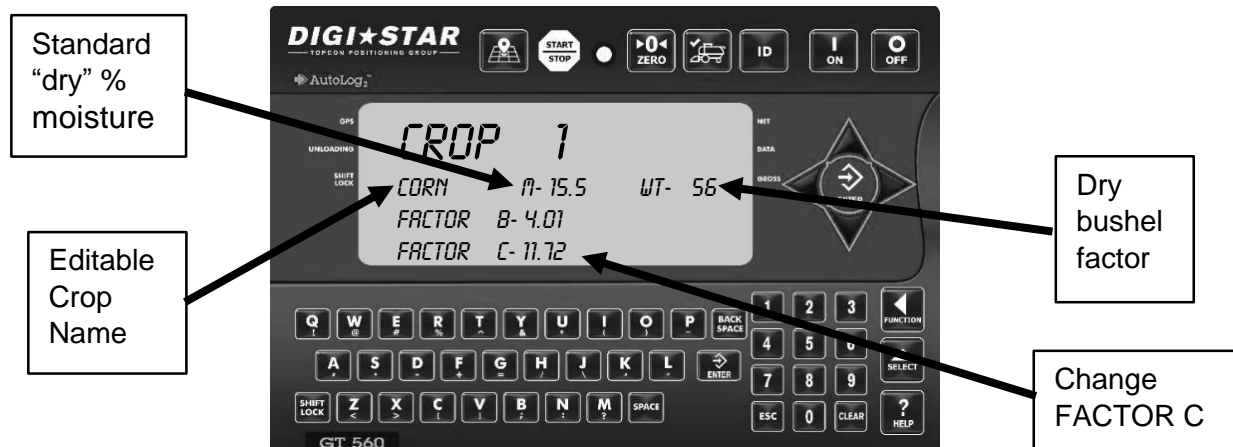
- 1) Harvest grain as normal and transfer grain from combine into the grain cart until the cart is at least half full.
- 2) Keep track of the combine's average moisture % for the harvested load.
- 3) Select GRAIN type on GT560 (press  then  use  &  arrows, and press  x4).
- 4) Begin unloading grain at normal speed. AutoLog will start on GT560.
- 5) On main screen in center, observe the moisture %. See diagram below.
- 6) Press  or  arrow keys to adjust moisture up or down. Grain must be unloading from the cart and passing by the Sensor for this step to work.
- 7) Finish load as normal.
 - *Note: Moisture reading will likely stop before end of load. This is normal.
- 8) Run a second load and verify moisture % is close. Perform **Elevator Calibration** steps on next page to achieve greater accuracy.
 - *Note: If moisture % is very inconsistent or does not appear to stay calibrated, the sensor may need to be repositioned. Readings that change unexpectedly or by large amounts while unloading is a symptom of poor grain flow past the sensor.
- 9) Repeat calibration steps for other GRAIN types.



5.2 ELEVATOR CALIBRATION

Use this procedure for calibrating moisture based on a certified grain elevator moisture reading or a high quality, portable grain moisture reading device. This procedure will provide the most accurate moisture calibration. Each GRAIN type must be calibrated separately when harvested, such as when changing from CORN to SOY.

- 1) Harvest grain as normal and unload the combine into the grain cart.
- 2) Select GRAIN type on GT560 (press  then  use  and  arrows, and press  x4).
- 3) Unload grain normally. AutoLog will start and record data on GT560.
- 4) Take load to elevator, record moisture % measured at elevator.
- 5) Repeat taking a minimum of 4 loads to the elevator and record moisture for each. Calculate the average of all loads taken to elevator.
- 6) On GT560, review all unloadings that went to the elevator (use  and  arrows, then  arrow).
- 7) Calculate average moisture % of these loads from the GT560.
- 8) Compare average moisture % calculation on GT560 to average elevator moisture % and calculate the difference. (Elevator % – GT560 % = Difference)
Example: If GT560 is 20.5%, Elevator is 22.0%, then difference = 1.5%.
 GT560 needs to be increased by 1.5% to match elevator.
- 9) On GT560, select GRAIN type (press  then  use  and  arrows).
- 10) Press  until FACTOR C value is flashing.
- 11) Change FACTOR C by amount of difference, clearing old value & typing new value.
Example: If difference is 1.5% low from example above, and the current FACTOR C is 11.5, then increase FACTOR C by 1.5 to new value of 13.0.
- 12) Press  to save new value. GT560 returns to active screen.
- 13) Run additional loads to verify that the average moisture across loads is correct.
 *Note: If moisture % is inconsistent or does not appear to stay calibrated, the Sensor may need to be repositioned. Readings that change unexpectedly or by large amounts are symptomatic of poor grain flow past the Sensor.
- 14) Repeat calibration steps for other GRAIN types.



6.0 MAINTENANCE

- Visually inspect Grain Moisture Sensor hardware and cabling before harvest season.
- Perform **Moisture Sensor Test** before start of season.
- Clean Sensor with mild soap & water at start of season, or if grain was wet or stuck to other parts of cart. White sensor face can be dust covered, but not caked over.
- Check Sensor & cabling when performing overall inspection of grain cart.
- Check Sensor & cabling if it has contacted other objects such as stalks, branches, or posts. Perform **Moisture sensor Test** before next load.

7.0 TROUBLESHOOTING

Problem	Cause	Fix	
Moisture % not accurate; or moisture % very inconsistent	Wrong GRAIN selected	Select correct GRAIN type	
	GRAIN type not calibrated	Calibrate for GRAIN type	
	Sensor location problem	Change Sensor position	
	Dirty moisture sensor	Clean Sensor w/ soap & water	
	Small or partial load	Run larger loads	Lower Sensor position in cart
		Sensor or cable failure	Perform Sensor Test Replace failing part
	No moisture % on GT560 display	Sensor location problem	Change Sensor position
Dirty moisture sensor		Clean Sensor w/ soap & water	
Small or partial load		Run larger loads	Lower Sensor position in cart
		Cable unplugged or loose	Reconnect cable
Sensor or cable failure		Perform Moisture Sensor Test Replace failing part	
Sensor bracket comes loose or moves inside cart		Worn or loose hardware	Tighten hardware
	Add hardware with lock nuts		
	Add more hardware		