



SERVICE MANUAL

81850A Module
TexMax 2 Microwave Scanner
*Installation, Wiring, and
Operation Guide*



SAMUEL JACKSON

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We appreciate your business and hope you enjoy your TexMax 2

This manual contains information on the installation, wiring and use of your TexMax 2. Included are sections on:

- Understanding the TexMax 2 readings
- How it works
- Assembly and installation
- Calibration and programming
- Operation tips

In the future when you require service, technical support, or parts please contact us by phone, fax, or the internet. Our engineers and service people are available to assist you in obtaining the best performance from your Samuel Jackson, Inc. products.

Again, thanks for choosing a Samuel Jackson TexMax 2

SAMUEL JACKSON, INCORPORATED
3900 UPLAND AVENUE LUBBOCK, TEXAS 79407
TELEPHONE 806-795-5218 OR 800-862-9966
FAX 806-795-8240
E-Mail: engineering@samjackson.com
Internet: www.samjackson.com

Understanding the TexMax 2 Readings

The TexMax 2 antennas are approximately 8 inches wide and 11 inches tall. The TexMax 2 is measuring average moisture through the module in a volume approximately as wide and as high as the antenna dimensions. This means that wet tops or bottoms can be missed using only a TexMax 2. Samuel Jackson recommends that the TexMax 2 be accompanied by a second moisture sensor (such as a Universal Resistance Sensor) to fully protect the gin from varying incoming moisture.

The TexMax 2 calculates a moisture value approximately 10 times a second (once every 100 milliseconds). Within each of these 100 millisecond readings, thousands of microwave readings are made. The moisture reading is continuously updated as the module passes in between the sensors and is held at the last valid reading if there is a gap between modules.

The TexMax 2 includes a feature that starts its microwave readings automatically and holds the last reading until a new reading takes place. Like any electromagnetic signal, the radio waves transmitted by the TexMax 2 will always take the easiest path available. If the readings are taken too close to the end of the module, the signal may go around the module rather than through it resulting in lower readings.

The temperature of the module should also be consistent within +/- 10 degrees Fahrenheit to ensure that any bias taken out during calibration remains constant. The dielectric constant for moisture changes with temperature, however these changes are small for normal module temperatures during ginning. Module temperatures close to or beyond freezing or boiling will not provide reasonable readings.

The TexMax 2 instrument is an extra tool, which should assist the ginner in assessing and controlling the operational status of his gin. The values provided by the TexMax 2 instrument should not be used to determine contractual or custody transfer issues. These issues should be determined by statistically representative sampling and laboratory analysis carried out to national or international standards.

Readings from this instrument are not certified to be used for contractual purposes.

Samuel Jackson Incorporated, its employees, its suppliers, and its contractors shall not be responsible for any consequential damage caused by the use of this device.

How it Works

The TexMax 2 uses microwave measurement techniques to measure the moisture content of the cotton lint in a module. The instrument measures the speed of the microwaves and the amount of microwave energy absorbed through the cotton.

The speed of microwaves through air is very close to the speed of light through space and the speed of microwaves through dry cotton is a little slower than through air. However, the speed of microwaves in water is considerably slower than that in dry cotton. The difference in this speed is attributed to a value known as the dielectric constant (sometimes called relative permittivity). The dielectric constant for air is close to 1, for dry cotton it is closer to 2 while for pure water it is approximately 80.

Similarly, the amount of microwave energy absorbed in air is less than dry cotton and dry cotton is much less than in water. Other factors, such as the density of the module, temperature of the cotton and even the way the cotton is pressed also need to be taken into account.

These factors, and many more, have been taken into account in the TexMax 2 moisture measurement system to give you an accurate, reliable, on-line cotton moisture measurement system.

Assembly and Installation

Assembly and installation of the TexMax 2 microwave moisture sensor is very straightforward. A TexMax 2 only needs about 10" X 12" of flat space on the side of the module feeder. It is important that the receiver and antenna are directly across from each other and that they are square to each other.

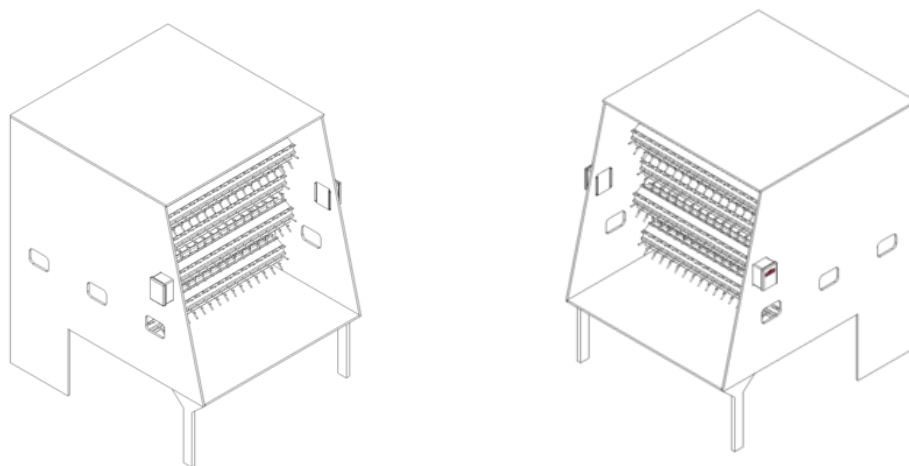
The following parts are shipped in one plastic container.

- 1 TexMax 2 receiver
- 2 TexMax 2 transmitter with touchscreen display
- 3 RF coax cable in non-metallic conduit



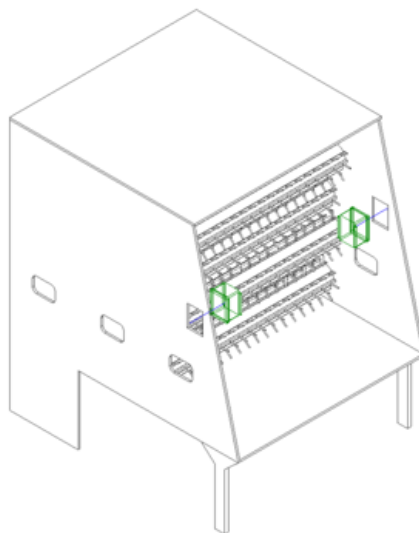
Locate an appropriate place in the module feeder for the TexMax 2. It is recommended that the transmitter and receiver be installed in the side of the module feeder head as far away from the spiked cylinders as practical to minimize interference. The cutout should be centered at 42 inches from the floor in order to be centered when used on round modules.

Cut out a hole on both sides of the module feeder for the Transmitter and Receiver. Be sure to locate them directly across from each other. The openings will be 11 5/8" tall and 8 1/2" wide. Refer to page 14 for a cutout dimension sheet.

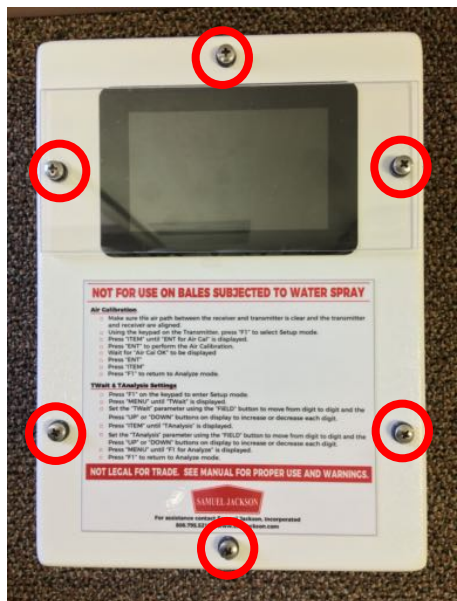


The transmitter enclosure has the display and is where most of the wiring connections will be landed. Mount it on the side that is easiest to see and to access with external wiring.

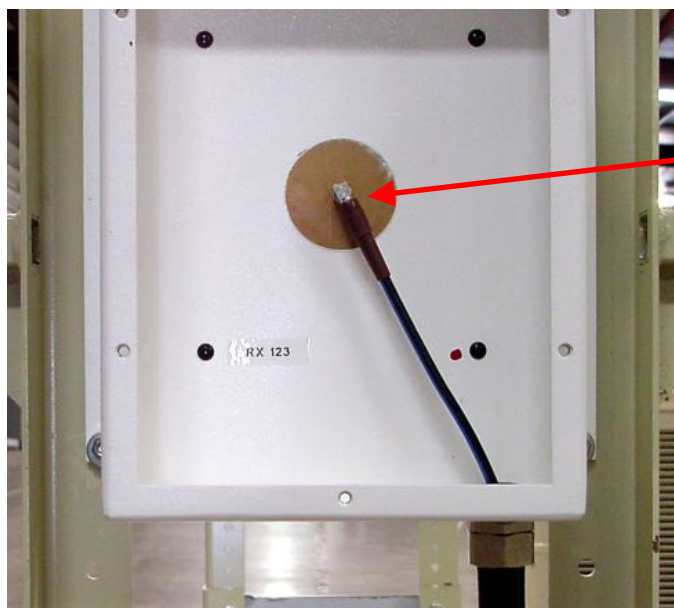
The Transmitter and Receiver mounting flanges need to be on the inside of the module feeder to minimize interference caused by steel in the microwave path, so install them from the inside.



For the next steps, you will need to remove the 6 screws holding the faceplates on the transmitter and receiver so that you can attach the special coax antenna cable and conduit from the receiver to the transmitter. Remove the screen protector and set it aside.

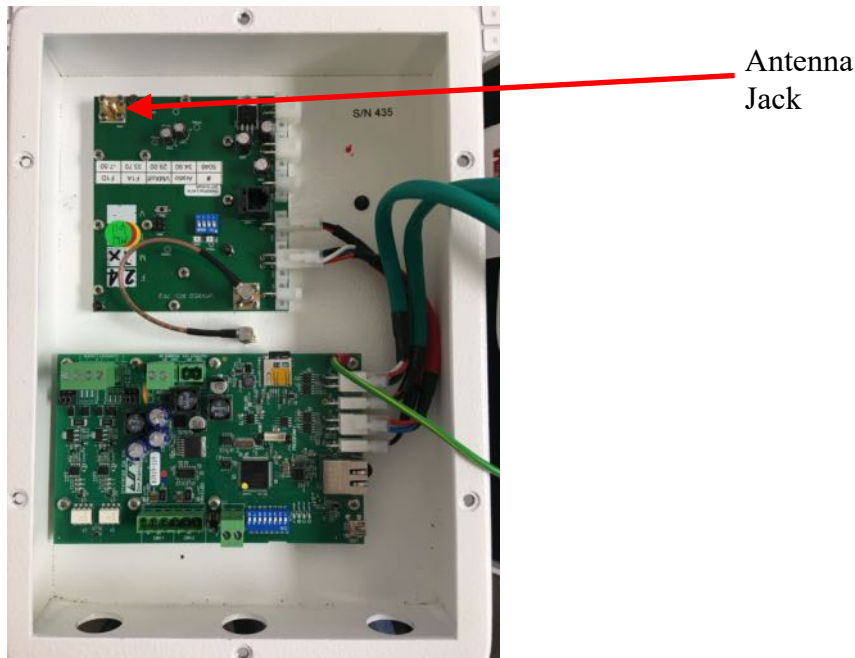


The unit is shipped with an antenna cable already pulled inside a special non-metallic, flexible conduit. Do not attempt to remove antenna wire from this conduit or modify its length. Mount one end of the conduit into the hole in the bottom of the receiver and attach the antenna cable to the jack. Tighten the cable finger-tight then carefully turn one quarter of a turn with a 5/16" (8mm) wrench. Be sure the antenna cable is connected firmly, but do not over-tighten as the circuit board is easily broken. Put the cover back on the receiver.



Antenna Jack

Run the antenna cable and conduit along the inside of the wire tray base from the receiver to the transmitter. Do not bend the antenna cable any more than necessary. Attach the antenna cable to the jack on the top left corner of the circuit board. Again, tighten the cable finger-tight then carefully add about one quarter turn with a 5/16" (8mm) wrench. Put the faceplate back on the receiver. Be sure to reinstall the screen protector over the touch screen.



Wiring

If you are using a Moisture Mirror X, it is recommended to run 3 conductors and one CAT-5E cable between the TexMax 2 and the Mirror Basic panel. The wires will carry 24vdc power for the instrument and the Ethernet cable will communicate the moisture reading to the Mirror. See the accompanying external wiring diagram for details.

If you are using an older Moisture Mirror without Ethernet capabilities, you'll need to run 5 conductors from the TexMax 2 to the Mirror Basic panel. One pair will carry 24vdc power and a second pair will carry the moisture value via a 4-20mA signal.

Make one last check to be sure that the sensors are pointed directly at each other. If the module feeder isn't square, it may be necessary to put washers or shims between the walls and the Texmax 2 enclosures to make it closer to square. With everything hooked up, you can apply power and proceed with calibration.

Programming

Now that the TexMax 2 is installed, you must program certain parameters for operation in your gin. The TexMax 2 can be in one of two modes at any given time: Setup mode or Analyze mode. Analyze mode is the normal operating mode and Setup mode is used to program and calibrate the sensor.

Setting the Offset parameter the sensor should only be done after all other programming is complete.

Offset

The Offset parameter allows you to adjust the TexMax 2 to more closely match results from laboratory analysis. If, for example, the TexMax 2 displayed a moisture of 6.7% for a particular module, but laboratory analysis of that module proved the moisture to be 6.5% an offset of -0.2 can be entered to allow the TexMax 2 to more closely match the laboratory result.

Setting the Offset parameter should only be done after all other programming is complete.

To enter this value into the TexMax 2, follow these steps:

- Press “F1” on the touchscreen to enter Setup mode.
- Press “MENU” until “*Set Parameters*” is displayed.
- Press “ITEM” until “*Offset*” is displayed.
- Set the “Offset” parameter using the “FIELD” button to move from digit to digit and the “UP” and “DOWN” buttons to increase or decrease each digit.
- Press “MENU” until “*F1 for Analyze*” is displayed.
- Press “F1” to return to Analyze mode.

Analog Output Scaling

The 4-20mA analog signal from the TexMax 2 can be scaled to accommodate the device receiving the bale moisture information. By default the TexMax 2 reports 0% moisture as 4mA and 30% moisture at 20mA. These values should not normally need to be changed.

To alter these values in the TexMax 2, follow these steps:

- Press “F1” on the touchscreen to enter Setup mode.
- Press “MENU” until “*Set Parameters*” is displayed.
- Press “ITEM” until “*Moist 4mA*” is displayed.
- Set the “Moist 4mA” parameter using the “FIELD” button to move from digit to digit and the “UP” and “DOWN” buttons to increase or decrease each digit.

- Press “ITEM” until “*Moist 20mA*” is displayed.
- Set the “Moist 20mA” parameter using the “FIELD” button to move from digit to digit and the “UP” and “DOWN” buttons to increase or decrease each digit.
- Press “MENU” until “*F1 for Analyze*” is displayed.
- Press “F1” to return to Analyze mode.

Width

The Width parameter lets the TexMax 2 know whether the module is a standard US module (90 inch wide) or a John Deere round module (94 inch thick, diameter varies up to 94 inches).

To enter this value into the TexMax 2, follow these steps:

- Press “F1” on the touchscreen to enter Setup mode.
- Press “MENU” until “*Set Parameters*” is displayed.
- Press “ITEM” until “*Width*” is displayed.
- Set the “Width” parameter using the “FIELD” button to move from digit to digit and the “UP” and “DOWN” buttons to increase or decrease each digit.
- Press “MENU” until “*F1 for Analyze*” is displayed.
- Press “F1” to return to Analyze mode.

Equation

The TexMax 2 Equation should normally be set to 3 which is the factory default. Consult the factory before changing this parameter to anything other than 3.

To enter this value into the TexMax 2, follow these steps:

- Press “F1” on the touchscreen to enter Setup mode.
- Press “MENU” until “*Set Parameters*” is displayed.
- Press “ITEM” until “*Equation*” is displayed.
- Set the “Equation” parameter to 3 using the “FIELD” button to move from digit to digit and the “UP” and “DOWN” buttons to increase or decrease each digit.
- Press “MENU” until “*F1 for Analyze*” is displayed.
- Press “F1” to return to Analyze mode.

Module Default Parameter Values

Item	Explanation	Range	Default Setting
Hi Mst Alarm	High Moisture Alarm Value	00.0 to 99.9	30.0
Alarm TO	High Moisture Alarm Time-Out	00.0 to 99.9	05.0
Alarm IA		Instant/Average	Average
Twait	Time delay between detecting a module and commencing measurements	00.0 to 60.0 s	0
TAnalysis	Duration of moisture analysis	00.1 to 30.0 s	15
TRepeat	Minimum Delay between readings	00.00 to 60.00	00.00
DBTrigger		00.00 to 99.99	04.00
IP1/Dual Input	Trigger off of Input 1 only or require Input 1 and 2 to be made	Dual/Input 1	Input 1
Sensor Mode		Low/High/Off	Off
Smoothing TC	Smoothing time constant	0 to 1000 seconds	75
Offset	Adds any required bias to the moisture readings	-99.99 to 99.99	00.00
Moisture 4 mA	Moisture at 4mA on the output current loop	00.0 to 99.9 %	00.0 %
Moisture 20mA	Moisture at 20mA on the output current loop	00.0 to 99.9 %	30.00%
SeedToLint		Yes/No	Yes
Beep High		00.0 to 30.0	00.0
Width Units	Set units for Width Parameter	m or in	m
Width	Width of the Material Under Test (module width)	0.000 to 10.000 Meters 0.00 to 99.99 Inches	2.300
Odometer	Number of readings taken	Read-Only	Read-Only
Equation	Selects the calibration equation to be used.	1 to 4	3
IP Address	IP Address of this Module TexMax	TM1 – 10.52.18.132 TM2 – 10.52.18.133	TM1 – 10.52.18.132
IP Mask	IP Mask of this Module TexMax	255.255.252.0	255.255.252.0
IP Gateway	IP Gateway of this Module TexMax	10.52.18.254	10.52.18.254
Modbus IP	Where the TexMax should send data	(MMX – 10.52.18.30 Spectrum – 10.52.19.0)	MMX – 10.52.18.30 (Should be changed per installation)

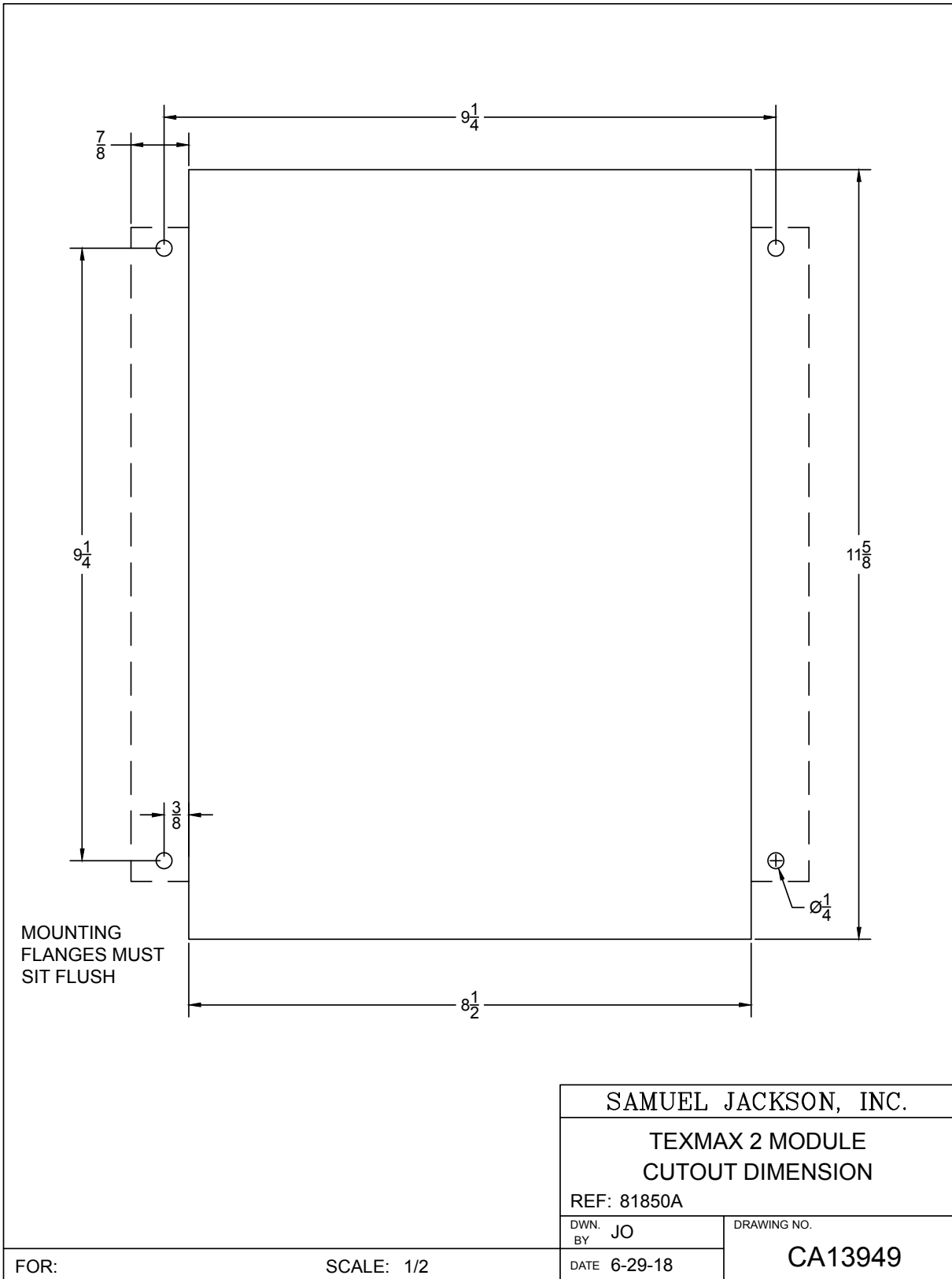
Item	Explanation	Range	Default Setting
Modbus MST	Modbus Address for Module Moisture	MMX Incoming 1 – 2010 MMX Incoming 2 – 2012 Spectrum Incoming 1 – 0000 Spectrum Incoming 2 – 0002 Spectrum Incoming 3 – 0004 Spectrum Incoming 4 – 0006	MMX Moisture 1 – 2010 (Should be changed per installation)
Modbus Bale	Modbus Address for Bale Made signal.	MMX Incoming 1 – 2011 MMX Incoming 2 – 2013 Spectrum Incoming 1 – 0040 Spectrum Incoming 2 – 0041 Spectrum Incoming 3 – 0042 Spectrum Incoming 4 – 0043	MMX Moisture 1 – 2011 (Should be changed per installation)

Error Codes and Troubleshooting

- E1 The temperature of the electronics is out of range (Temp Low, Temp High).
- E2 Unreasonably low Phase reading.
- E3 Looks like you are trying to analyze an air path; no module between antennas.
- E4 Microwave attenuation too high; error in reading the microwave signal.
- E5 Unable to calculate moisture e.g. would cause division by 0; wrong calibration equation.
- E6 Moisture out of limits; out of "Min moisture", "Max moisture" range.
- E8 Mass / Density / or Thickness out of limits; no bale between antennas.
- E9 VMX850 reply time out condition; faulty serial connection between boards.
- EA Tying to do an air calibration with module between antennas or antenna alignment error.

Most errors will clear themselves when the next valid reading occurs.

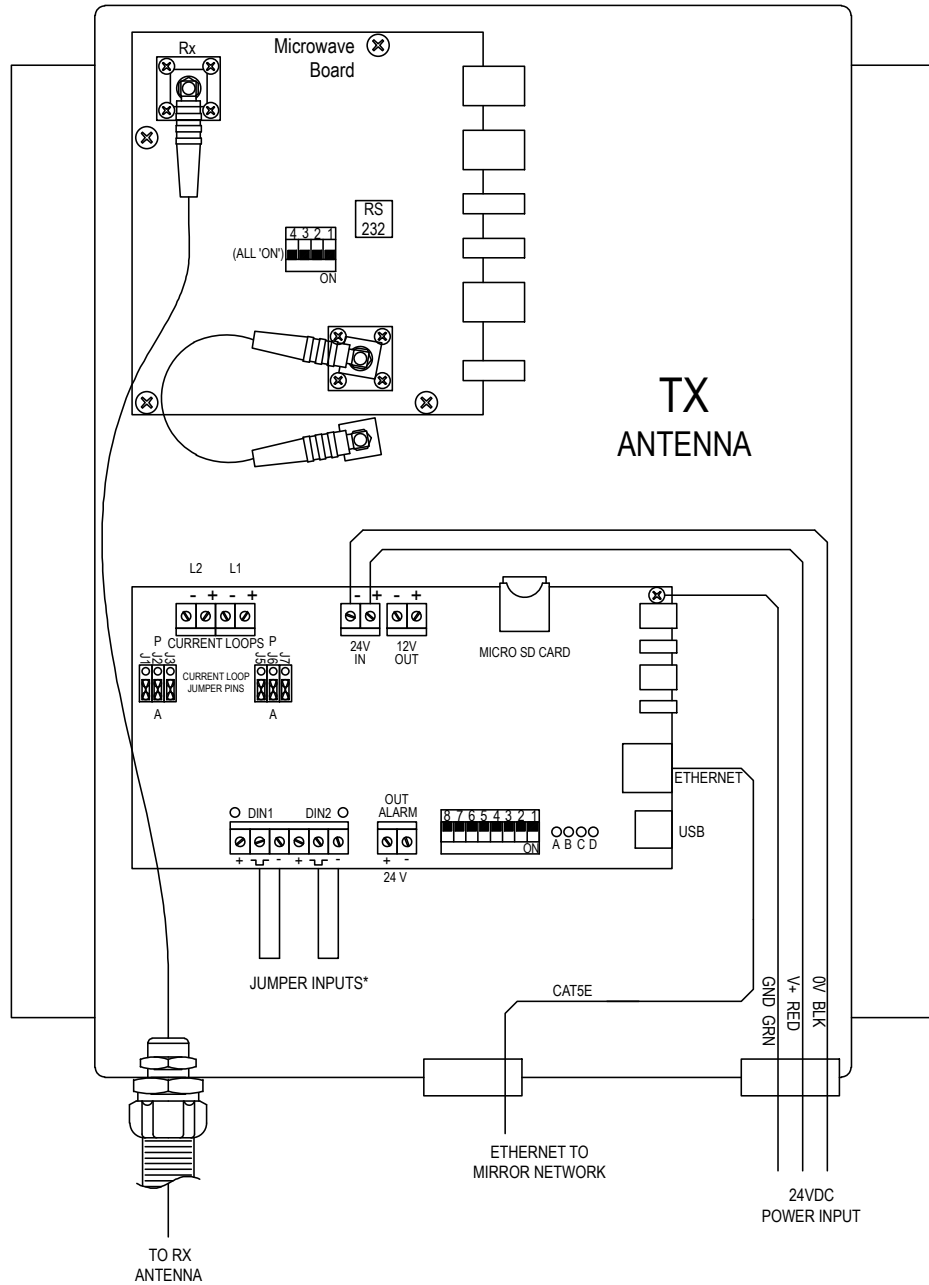
Cutout Dimensions



Wiring Diagrams

ETHERNET ELECTRICAL CONNECTIONS 81710A Texmax Microwave Moisture Sensor

CA13947
11-17

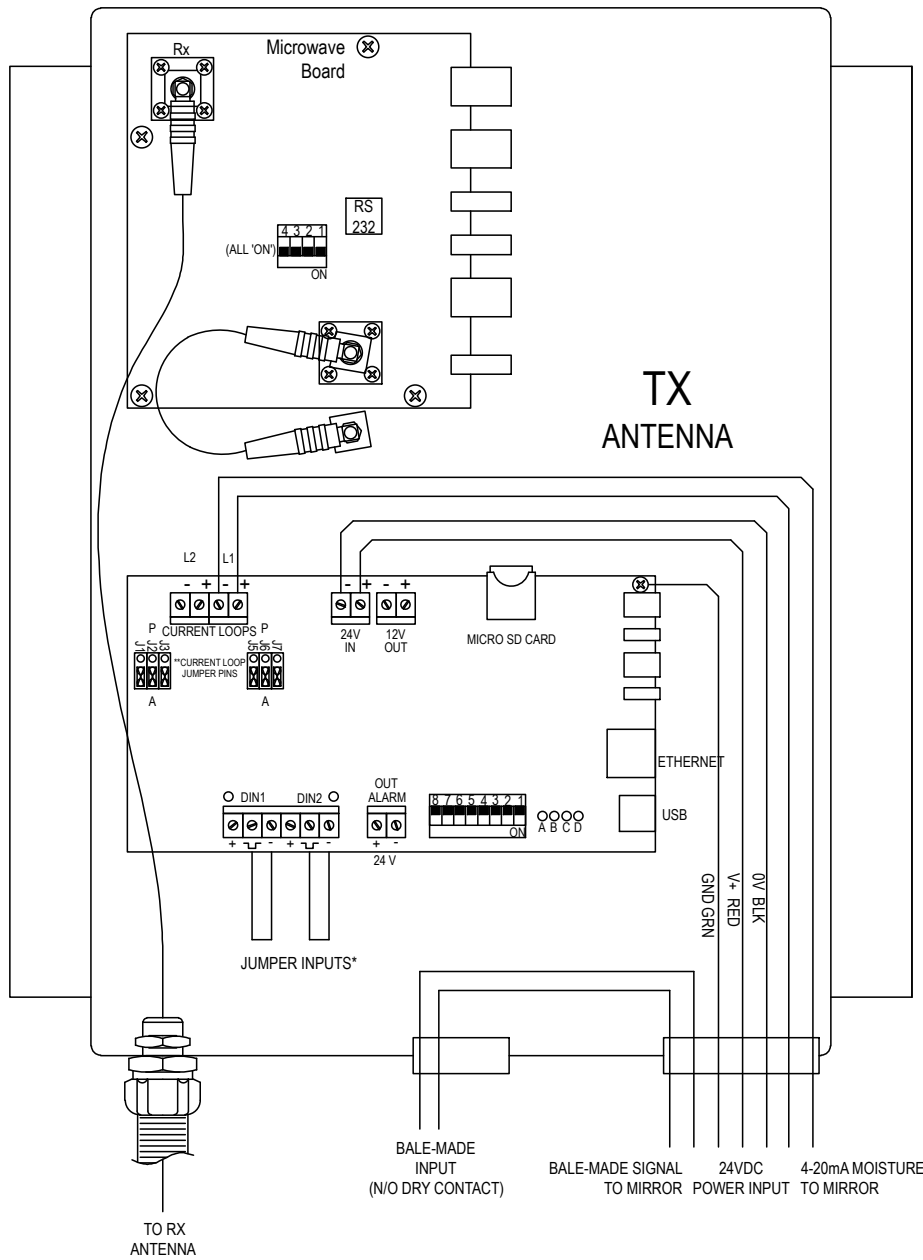


NOTES:
*INPUT 1 (DIN1) MAY BE USED WHERE THERE IS NO SEPARATION BETWEEN BALES AT TEXMAX

ANALOG ELECTRICAL CONNECTIONS

81710A Texmax Microwave Moisture Sensor

CA13948
11-17



NOTES:
 *INPUT 1 (DIN1) MAY BE USED AS TRIGGER WHERE THERE IS NO SEPARATION BETWEEN BALES AT TEXMAX
 **CURRENT LOOP JUMPERS SHOULD BE SET TO ACTIVE



IMPORTANT!

The following notice affects your warranty.

Electrical Controls and Your Safety

Your new Sam Jackson product may be equipped with electrical controls, or designed to interact with controls on a related Sam Jackson product.

In the event that local, state, federal or other specified safety compliance is required, we will consider modifications to meet the particular requirements. Implementation of alternative safety devices may incur additional charges. No warranty of compliance with a particular standard is made in the absence of specific reference to it in our quotation.

If you modify, or permit others to modify, these controls without specific written permission from Sam Jackson, Inc. the warranty on your product will be void and there is a possibility of serious damage to machinery, damage to product, serious injury to personnel, or death. The modifier of the controls assumes all liability for these consequences.

Samuel Jackson, Incorporated
3900 Upland Avenue
Lubbock, Texas 79407
806-795-5218