



20/20 Multi-Tester Instructions





Precision Planting, Inc.

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Precision Planting Warranty & Liability Policy (Revision effective 7-1-10)

Warranties, Disclaimers, and Limitation of Remedies:

These terms and conditions represent the entire agreement between the parties hereto and there are no collateral, oral, or other agreements or understandings, unless expressly stipulated.

Precision Planting warrants that all Precision Planting products, equipment and merchandise are free from defects in material and workmanship. The term of the express warranty recited herein shall be limited to one (1) year from the date of sale by Precision Planting. This warranty shall only extend to the dealer if this warranty is properly presented to Customer. With respect to 20/20 SeedSense, AirForce and RowFlow, the express warranty recited herein shall only apply if such products are properly registered by the Customer.

These terms and conditions represent the entire agreement between the parties hereto and there are no collateral, oral, or other agreements or understandings, unless expressly stipulated.

The express warranty recited herein does not extend to any costs or damages other than one of the following, which Precision Planting shall elect at its sole discretion: replacement, repair, or refund of the purchase price. Precision Planting makes no other warranty of any kind whatsoever, express or implied.

ANY EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED BY PRECISION PLANTING. THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.

Precision Planting is NOT LIABLE FOR CONSEQUENTIAL DAMAGES of any nature whatsoever, including without limitation lost yield, replanting cost, supplies or other expenses. Precision Planting is NOT LIABLE FOR INCIDENTAL DAMAGES of any nature whatsoever, including without limitation diagnostic and installation expenses, travel expenses, and shipping expenses. The limitations of remedy recited herein apply to any action by the Customer whether or not such action is based in warranty.

Some states or jurisdictions do not allow the exclusion or limitation of implied warranties, incidental damages or consequential damages; so the above limitations or exclusions may not apply to you.

Liability:

Customer assumes all liability for damages from accidents caused by or incurred in the use of transportation of said equipment. Customer agrees to indemnify and hold harmless the said Precision Planting, its officers, agents, and employees from any and all damages and/or liability to any person whomsoever arising out of or resulting from the use, storage, or transportation of said equipment by the Customer or anyone else while the equipment is in the custody of the Customer. The Customer acknowledges receipt of the equipment in good working condition and repair. In the event of any accident involving said equipment, Customer shall promptly furnish to Precision Planting a complete report in writing, with names and addresses of witnesses and parties involved and Customer shall make all reports required by law. Customer agrees to review and follow any published safety instructions in the product manual.

Notice of Non-Waiver:

The failure by Precision Planting, at any one or more time, to insist upon the strict performance by the Customer of the covenants, conditions and/or terms of this agreement, shall not be construed as a waiver of Precision Planting's right to demand strict compliance with and performance of all covenants, conditions and/or terms hereof. Notice of demand for strict compliance is hereby waived by the Customer, and time is expressly made of the essence of this agreement.

Choice of Law:

Any dispute or claim arising from or related to this Policy, or related to a product governed by this Policy, shall be governed by the laws of the State of Illinois.

Safety Information



Always wash your hands after working on or around agricultural equipment prior to eating, drinking, smoking, chewing, etc...



Always use the proper Personal Protective Equipment (PPE) for any task.

Examples include: Gloves when handling sharp or abrasive materials
Eye protection when handling contents or systems under pressure (ie. Hydraulic, Pneumatic, Water)
Welding helmet, Welding gloves, and welders clothing when welding/torching



Prior to working under or at ground level of any equipment secure the machinery from movement; accidental user operation or simple rolling of equipment. This should involve Lock-Out tags at the battery, removal of the Ignition key, "Do Not Operate" signs placed at key locations, as well as wheel chocks as necessary.



When working on a vehicle or implement's hydraulic system, suspended components may suddenly drop. If you are working on or around the implement at this time serious injury could result. If possible lower the implement or attachment to the ground before beginning any work. Alternatively; use mechanical lock-up devices to secure any components in their lifted positions.



Agricultural equipment may have been exposed to many types of chemicals. Any chemicals or residues should be removed from the planter prior to beginning work. Obey all existing (new & original) warning signs and caution labels on all equipment.



When working on or around equipment that has been or is running many components may get extremely hot. To avoid injury &/or serious burns allow all equipment components to properly cool before working on or around them.



Avoid wearing loose or ragged clothing or jewelry around equipment, with special attention to avoid moving parts.



Route and secure all wires and connections to avoid crimping or damaging. This may result in unexpected shortages and shocks.



Use extreme caution when working on pressurized systems (Air, Water, Oil). Relieve all pressure from a system before disconnecting lines, fittings, etc... Use a cloth or other obstruction to divert possible spray when disconnecting hose connections, fittings, fill caps, breathers, etc. Always use gloves, NEVER use bare hands. To locate or check for leaks use cardboard, never your hand.



Electrical components and devices may contain high voltages and should be kept dry and closed.

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The Multi-Tester Harness (725688, 725691) MUST BE CONNECTED to the Multi-Tester to power on. If the harness is disconnected, the tester will power down. TO PREVENT BATTERY DRAIN, remove harness when finished using Multi-Tester to ensure that the Multi-Tester is not accidentally turned on.



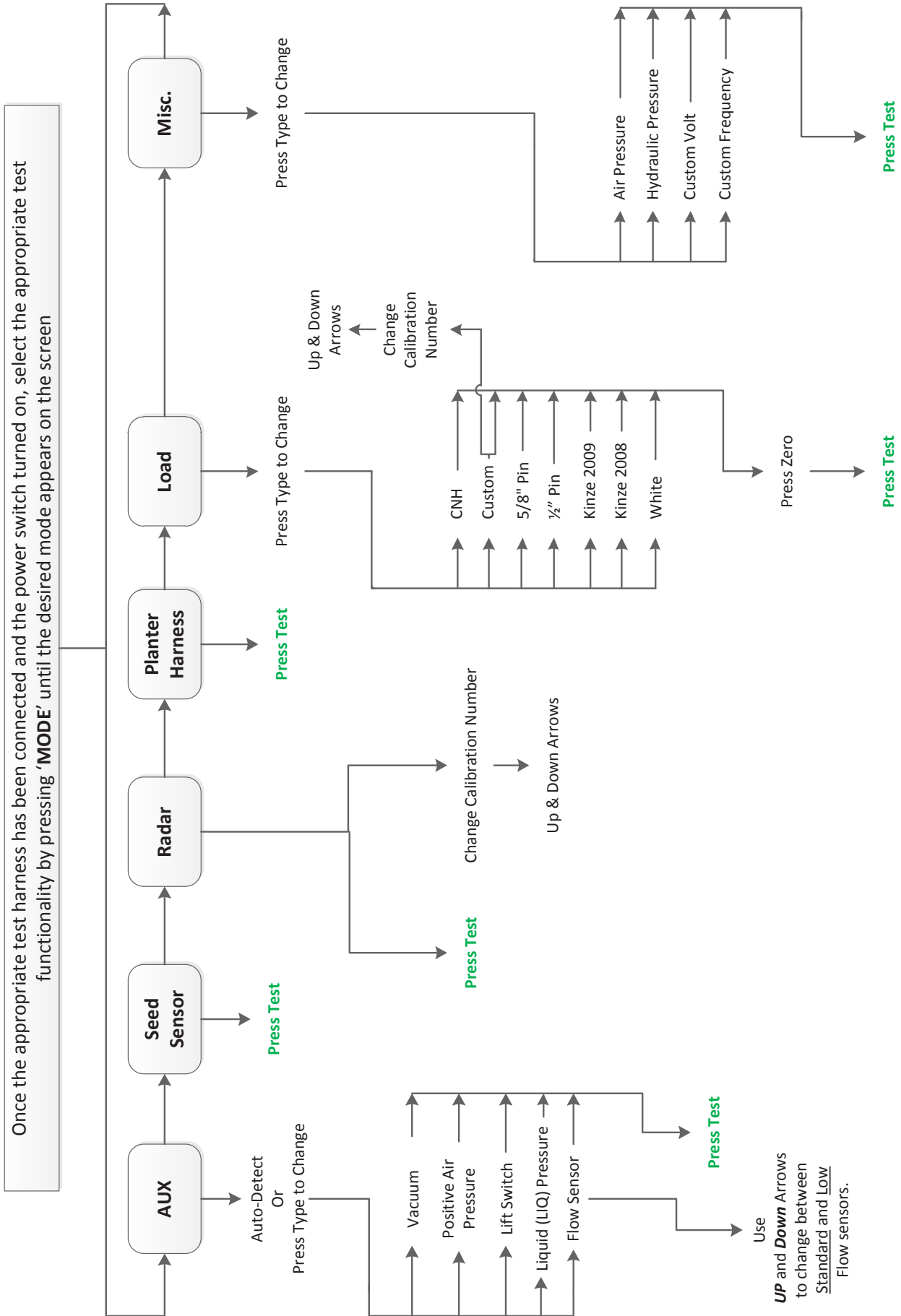
The Multi-Tester has six different modes and two harnesses to test each of the following sensors and harnesses: seed sensor, load sensors, RUM AUX sensors, planter harness, radar, and miscellaneous sensors. Each harness connection is associated and labeled with a specific mode that the Multi-Tester should be in to test the sensor connected. Use the menu path on the following page for directions on how to select the correct mode and sensor.

Notes on Sensors:

Misc: Air Pressure is also used to test the liquid pressure and air pressure sensors in the AirForce compressor tank and airbags.

*For Sidedress use, the flow sensor will need the **727303** harness to connect to the Multi-Tester.*

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Testing Sensors and Harnesses

To test a sensor or harness, connect the sensor or harness to the Multi-Tester Harness and select the correct mode for that harness connection. Once the correct mode is selected, press the “Type” button to select the correct sensor. The AUX mode has an Auto Detect option that will automatically select the correct sensor based on what is plugged into the tester.

Once the correct sensor or harness is selected, press the test button and activate the sensor. The following are readings that the Multi-Tester should give for each sensor type.

Vacuum and Positive Air Pressure Sensors – Shows the pressure in PSI that the vacuum sensor is currently reading.

Lift Switch – Should give an “extended” or “depressed” reading and also the voltage for each reading (should be 0v and 5v for push button lift switch).

Liquid (LIQ) Pressure, Air Pressure, and Hydraulic Pressure – Shows a PSI reading from the sensor.

Flow Sensor – Shows a GPM (Gallons per minute) reading from the sensor. (**Note:** *be sure that the correct low or standard flow is selected. The Multi-Tester will not give an error reading for the wrong sensor*).

Seed Sensor – Shows the number of seeds passing through the sensor and also the Hz reading.

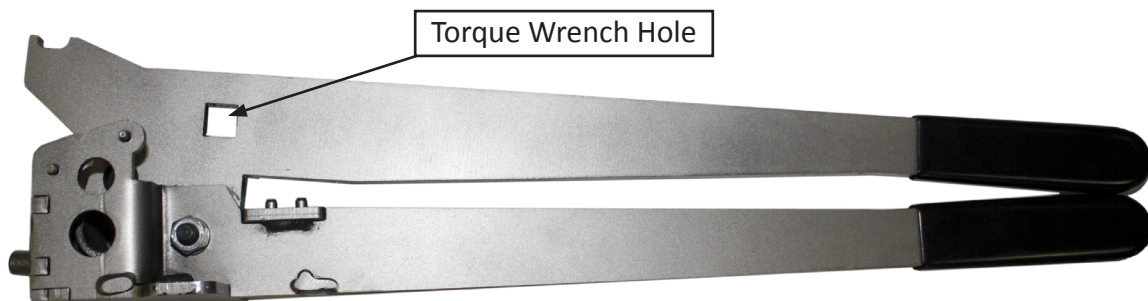
Radar – Shows a MPH reading that can be compared to the 20/20 reading.

Planter Harness – Shows the voltage on the power/ground wires and will give a “sig:fail” or “sig:ok.” A “sig:fail,” prompt indicates a problem may exist with the data signal. If it shows a low or no voltage (<7.0 v) then a problem may exist with the power/ground wires.

If a sensor fails to show any readings from the sensor, then the sensor may be bad and need to be replaced.

Testing Load Sensors

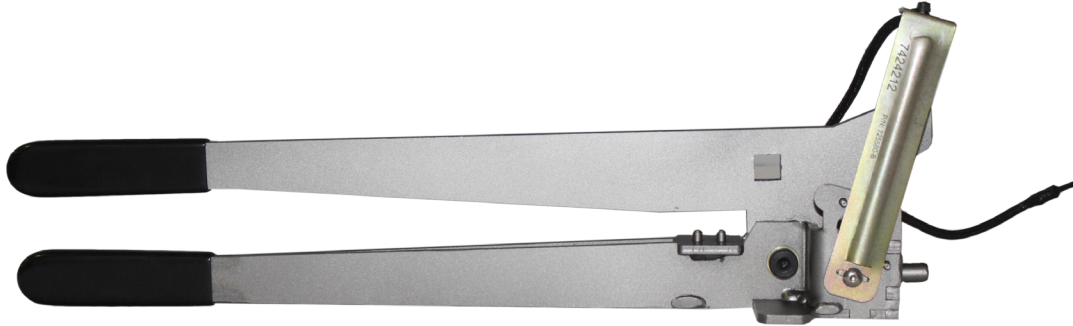
To test load sensors, it should be run through a four step testing process which is detailed on the next page. To help with this, the load applicator will be used to help apply known loads to the load sensor. Each load sensor has a specific way that it is loaded in the load applicator. The following list describes how each sensor needs to be loaded. Once each load sensor is correctly loaded in the applicator, make sure that the correct load sensor is selected on the Multi-Tester and press zero with **no weight on the sensor.**



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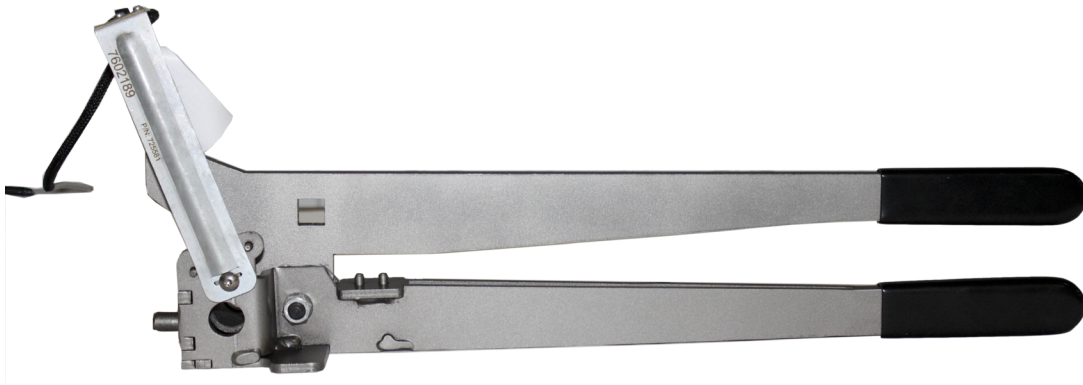
5/8" pin

The 5/8th pin must be placed in the tester with the bracket on the **right** side of the tester and with the bracket between the two positioning pins. Push bracket tight to frame of tester.



1/2" pin

The 1/2 pin is placed in the tester from the **left** side of the tester and slides between the two positioning pins. Push the bracket tight to the frame of tester.



Kinze D-Link

The Kinze D-Link load sensor will be placed on the front of the applicator. The round hole in the load sensor will be placed on the peg in the front of the tester and the top of the pin will be placed on the handle.



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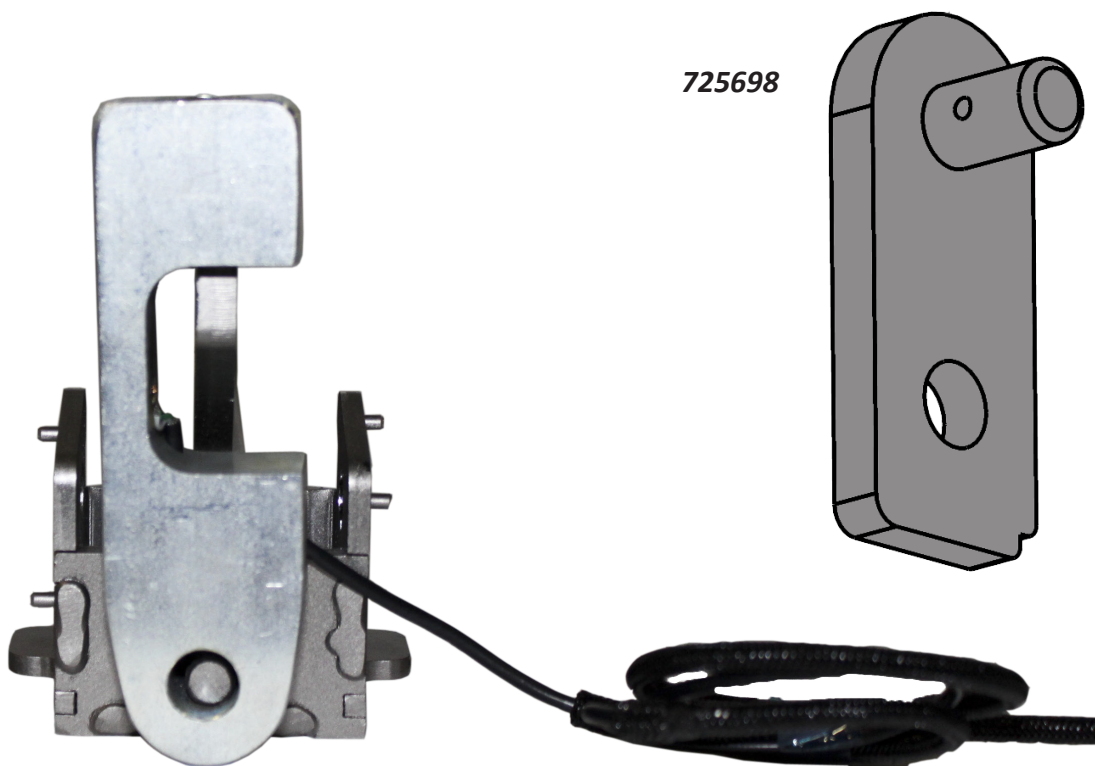
Case IH load Sensor

The Case IH load sensor is placed between the base and the handle of the tester on the small base right below the ½ drive hole. The sensor should be placed with the side that has the Precision Planting stamp up.



White load sensor

To test the 6000 series White load sensor, the pin hole of the sensor will be placed on the Kinze peg and the threaded bolt hole will be placed on the top of the tester handle. To test the 8000 series, the adapter bracket (**725698**) will need to be used. Slide the bracket over the peg on the load applicator with the bracket pin facing out. The pin hole of the sensor will be placed on the bracket peg and the threaded bolt hole will be placed on the top of the tester handle.



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Four Step Load Sensor Process

To test load sensors, each load sensor should be run through the following four step process. The load applicator will be used to help apply the loads to the sensors.

1. Shock/Heavy Load – Apply a very quick and heavy load (400 lbs or more) to a weigh pin.

Instructions for Shock/Heavy Load test:

Once the weigh pin is loaded in the correct position on the tester, a heavy load must be applied quickly. The best way to do this is to bounce on the load applicator handle with your full weight. While doing this, look for load sensor readings of 400 lb+. The pin should then re-zero after the weight is removed. Since readings are taken once per second, the shock/heavy load test ensures that the pin is sending weight values to the 20/20 monitor. A bad weigh pin will have values that are extremely variable.

2. Cord Test – Test cable integrity for shorts and open circuits.

Instructions for Cord Test:

After the load pin has been plugged into the Multi-Tester, the cord test can be performed. To start, wiggle the cable up the entire casing length. After that, roll the cord between your index finger and thumb. The cable roll should be done up the entire length of wire and you want to bend the wire in every direction to properly complete the cord test. Any disruptions made during the testing process indicate a faulty harness and bad weigh pin.

3. Water Test – Test pin readings with water sprayed onto the load sensor or the pin completely submerged.

Instructions for Water Test:

The water test will show any shorts or exposed wires that have not been properly sealed during the manufacturing process. The load applicator will not be needed to perform the water test. Only the multi-tester will be needed. To begin, a container of water large enough for the pin to fit in is needed or a small amount of water may be sprayed onto the load sensor. The next step is to completely submerge the pin and let it sit in the container. Make sure that the sensor is completely saturated to perform the test. The Multi-Tester should not show weight readings, but weight fluctuations from zero to five pounds are acceptable. If a pin fails a water test, attempts at repair may be made by cleaning the surface, allowing time to dry and applying Permatex Sensor Safe Blue RTV Gasket Maker #8022. Be sure to add a thin layer because adding too much coating may interfere with inserting the pin back onto the row unit.

4. Known Weight – Apply a consistent and known weight to load sensor over a period of time to check for accuracy.

Instructions for Known Weight:

A torque wrench is the best way to apply a known load to the applicator and load sensor to test that the load sensor reading is within 20% of expected values. Due to the variability of torque wrenches, the best way to use the torque wrench on the load applicator is to take a load sensor that is known to be good and test it with the torque wrench at different torque settings. This will allow you to develop a load sensor reading chart for that specific torque wrench and each torque setting. An example chart is located on the next page.

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Torque Setting	Load Sensor Reading
35 ft. lbs	105.5**
55 ft. lbs	180.9**
75 ft. lbs	265.6**

** These load Sensor readings **Will Be Different** for every torque wrench. You need to make a chart for each torque wrench and each type of load sensor.

This will need to be done with each type of load sensor. When using a breaking torque wrench, it is important that pressure is applied slowly to the load sensor since the Multi-Tester is taking readings once per second. As the torque wrench approaches the breaking point, it is crucial that the pressure is held steady and is added slowly to the load sensor. This will give the Multi-Tester time to update the load reading. The goal is to achieve the highest and most steady reading before the torque wrench breaks.