

INSTRUCTION MANUAL

# ***ORION<sup>®</sup> 910***

## ***MOISTURE METER***



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# INTRODUCTION

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## Congratulations!

You have purchased one of the most accurate moisture measurement instruments for wood in the world. Using IntelliSense™ technology, hand-held moisture meters from Wagner Meters have been proven by universities and institutes worldwide to provide superior measurement results.\*

With its electromagnetic field, your Orion® 910 moisture meter covers a relatively large cross-sectional area each time you take a reading, giving you a far better representation than other technologies of the true moisture content of your wood.

Wagner moisture meters read **IN** the wood, not just on the wood.



The 2.0-inch (50mm) wide by 2.5-inch (63mm) long by .75-inch (19mm) thick sensor field of your Orion® moisture meter closely approximates the full-thickness cross-section method used when performing the ASTM D4442-16 oven-dry lab method. This ASTM standard

(and its international counterparts) is the standard to which all moisture meters for wood are compared for accuracy.

Your Orion® 910 is appropriate for reading into the wood to .75" (19mm). The meter can be used on non-solid wood products, and the Species Setting Booklet includes a few settings for some of these common materials.

In the Standard Measurement mode, your Orion® 910 measures moisture content within the 4.0% to 32.0% moisture content range.

***NOTE:** Measurement range may vary slightly depending on species setting of the meter.*

The Orion® 910 has an easy-to-read digital display, scaled in 0.1% increments when in the Standard Measurement mode for your solid wood applications.

Wagner hand-held moisture measurement technology is virtually unaffected by wood temperature.\*\*

Since 1965, Wagner Meters has been providing quality moisture measurement equipment and Wagner's technology has been proven to provide some of the most accurate results in the industry when compared to the ASTM D4442-16 Standard. Wagner meters have been used for years by professional lumber-grading associations, and meters from Wagner continue to provide reliable and consistent moisture measurements, with unsurpassed convenience and ease of use.

*\*Information available upon request. \*\*Contact a Wagner Meters expert at 844-689-0660 if your wood is very hot or frozen.*

# ORION® 910 PARTS



## QUICK START: BASIC USE FOR SOLID WOOD

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With your Orion® 910 turned OFF, press and release the ON/HOLD button. Meter will turn on and briefly display the model number, followed by the firmware revision number. If this is the first time you are using your new Orion® 910, immediately after the revision number is displayed, the meter display should revert to Standard Measurement mode, with the display showing 0.0% when the meter is held in the air. If meter display does not display 0.0%, then refer to page 8 regarding the SPECIES/MATERIAL button.



Next, press the SPECIES/MATERIAL button once, and the current species setting (calibrated to specific gravity) will appear. The factory default display will be 0.50 for a new meter. Use the UP or DOWN arrow buttons to set the correct species setting for the wood species you wish to measure (refer to your Species Settings Booklet to find the correct setting). Finally, press the ON/HOLD button to place the meter back in the Standard Measurement mode.

**NOTE:** *If you cannot find the correct setting for the wood species or material you wish to measure, go to [www.wagnerspecies.com](http://www.wagnerspecies.com) where you can access Wagner's extensive Species Database. If you still cannot find the correct setting, contact a Wagner Meters expert at 844-689-0660.*

Grasping the meter on the sides, begin taking measurements on the face of the wood pieces by pressing down firmly, making sure the rectangular sensor plate area on the back side of the meter is pressing firmly on the wood surface and completely covered by the wood.

Minimum wood dimension needs to be 2.0 inches (50mm) wide by 2.5 inches (63mm) long by .75 inches (19mm) in thickness. When taking measurements, make sure there is a 1-inch (25mm) minimum air gap underneath the wood you are measuring (refer to Correct Usage Guidelines section of this manual).



For wood materials that have a grain and nonuniformity, place the meter in line with the grain.

When you are finished taking measurements and wish to turn the meter off, press the ON/HOLD button for approximately 2 seconds. Alternatively, the meter will automatically shut off after approximately 60 seconds of

no activity.

## **CORRECT USAGE GUIDELINES FOR YOUR ORION® 910 MOISTURE METER**

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To make sure that you are getting the most accurate readings from your Orion® 910 meter, Wagner Meters recommends that you pay close attention to the following guidelines:

1. If the thickness of the piece of wood or other building material is greater than 1.5 inches (38mm), it is a good idea to take measurements on both sides and average the readings.
2. To prevent high or inaccurate readings, always have a minimum 1-inch (25mm) air gap underneath the piece of wood you are measuring. During this process, make sure your hand is not directly underneath the meter.

3. Your Orion® 910 meter is appropriate for reading into the wood to .75" (19mm). If you wish to measure wood pieces with thicknesses less than .75 inches (19mm), the meter will underestimate the actual moisture content. Thicknesses that are slightly thinner (example: .625 inches (15.9mm)) will not be underestimated substantially, but the thinner the piece becomes, the more the measurement will be underestimated. For pieces thinner than .50 inches (12.7mm), it is recommended that you put two or more pieces together to obtain a composite measurement (if needed, contact Wagner Technical Staff for additional assistance).
4. The actual sensing area is a 2.0-inch (50mm) wide by 2.5-inch (63.5mm) long rectangle on the meter's backside (opposite side of the display and keypad). In order to take a valid measurement, this sensing area must be completely covered with the wood or other material you are measuring. If the sensing area is not completely covered, your moisture reading will be inaccurate.
5. If there is visible moisture or water on the surface of the wood or material to be tested, wipe off any excess, and let the surface dry out for a couple of minutes before taking measurements. If possible, turn the board over and measure the other side.
6. Be sure to press down firmly to ensure good sensor plate contact with the surface of the wood or building material. This is especially important when measuring rough-sawn lumber.
7. Do not take readings where there is a noticeable defect or knot in the lumber.
8. To ensure optimum accuracy, orient your meter to the direction of the grain.



## **Our Technical Staff Wants to Help You:**

Please contact us at **844-689-0660** for specific guidelines on how to properly measure wood with unusual characteristics. Additional measurement corrections may be necessary if you are measuring lumber that is frozen, salt water-permeated, or is treated with CCA, ACQ, or any other treatment with metallic or other components that might bias the moisture readings.

# **FUNCTION BUTTONS: DETAILED USAGE INSTRUCTION**

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### **ON/HOLD Button**

When the meter is OFF, pressing and releasing the ON/HOLD button will turn the meter ON, with the meter briefly displaying the model number, followed by the firmware revision number. Immediately after briefly displaying the revision number, the meter will be in the Standard Measurement mode. At this point, the meter is ready to take moisture measurements. Be assured that any settings that you have previously programmed/selected will be active. In other words, turning off the meter will not cause the meter to revert to factory default settings, but will retain whatever settings you programmed it with.

When in the Standard Measurement mode, pressing and releasing the ON/HOLD button will freeze whatever reading is showing on the display. Additionally, the word HOLD

will show in the upper right-hand corner. This HOLD feature is valuable when taking measurements in hard-to-reach places where you cannot see the display.

If the AUDIO function of the meter is turned on (refer to the “Audio Button” section on page 11), the meter will emit a short beep every 4 seconds that the current reading remains on HOLD.

The current reading will remain on the screen until the ON/HOLD button is briefly pressed again, returning the meter back to Standard Measurement mode and HOLD will disappear from view.

**NOTE:** *Meter will shut down automatically after 60 seconds if the meter is left on HOLD with no measurement activity. Pressing the ON/HOLD button for 2 seconds will turn the meter off.*



### **UP and DOWN Buttons**

The particular settings mode (SPECIES/MATERIAL or AUDIO) that you are in at a given time will determine how these buttons will function. Settings values will be increased or decreased,

or different functions activated according to the specific instructions outlined for each settings button.



### **SPECIES/MATERIAL Button**

The SPECIES/MATERIAL button on your Orion® 910 is used to place your meter into one of three different modes by pressing the button until you are in the desired mode. The available modes are:

1. **Species Settings mode.** This mode is for programming the meter to the correct setting for the wood species you wish to measure. When in this mode, the meter display will indicate settings values from 0.20 up to 1.00. Factory default is 0.50.
2. **Relative Measurement mode.** Used for obtaining relative, rather than absolute, measurements, typically for non-solid wood applications (example: relative measurements on drywall). When you toggle to this mode, the display will show REL in the lower-left corner of the display when you are in the Standard Measurement mode. More information concerning Relative Scale can be found on page 11.
3. **Meter Calibration mode.** Follow the instructions on page 14 to perform your own field calibration using the included Orion® On-Demand Calibrator from Wagner.

When meter is ON, press the SPECIES/MATERIAL button; the meter display will indicate the current mode. If the meter is in the Species Setting mode (indicated by a 3-digit number such as 0.50, etc.), you can use the UP or DOWN arrows to program the meter for the correct setting. If you need to change modes, press and release the SPECIES/MATERIAL button. If you choose Relative Measurement (REL) mode, press ON/HOLD to select. For Calibration (CAL) mode, see page 24 for full instructions.

Regardless of the mode you choose, when the meter is turned OFF (or shuts off automatically), and then the meter is turned back ON, the meter will be in the mode it was in when it previously turned OFF.

## How to Program a Species Setting for Different Wood Species

FIRST, consult the Species Settings Booklet and locate the correct setting that corresponds to the type/species of wood being measured.

**NOTE:** *If you cannot find the correct setting for the wood species or material you wish to measure, go to [www.wagnerspecies.com](http://www.wagnerspecies.com). If you still cannot find the correct setting, contact Wagner at 844-689-0660.*

NEXT, once the meter is turned on, press and release the SPECIES/MATERIAL button until you are in the Species Setting mode. Once you are there, the meter will show the current setting with a decimal (e.g., 0.62 or 1.00). If the meter is being programmed for the first time, the default setting of 0.50 will be displayed on the screen.

While in this mode, pressing and releasing either the UP or DOWN arrow buttons will increase or decrease the setting of the meter by .01 each time a button is pressed and will update the display accordingly.



If the UP button is held down for 0.7 seconds, the setting will increase to the next multiple of .10 (e.g., if the setting is currently .36, the setting will change to .40). Every 0.7 seconds thereafter that the button is held down, the setting will change by another .10 (e.g., from .40 to .50).



If the DOWN button is pressed and held for 0.7 seconds, the setting will decrease to the next multiple of .10 (e.g., if the setting is currently .66, the setting will change to .60). Every 0.7 seconds thereafter that the button is pressed and held, the setting will change by another .10 (e.g., from .60 to .50).

When pressing the UP arrow button, once the maximum setting of 1.00 has been reached, the setting will wrap around to the minimum (.20) and continue to increase from there. Similarly, when continuing to press the DOWN button, if the minimum setting of .20 has been encountered, the setting will wrap around to the maximum (1.00) and continue to decrease from that point.



Once the species value has been set, press and release the ON/HOLD button to return the meter to measurement mode. Once in Standard Measurement mode, 0.0 will be displayed on the screen if the meter is held in the air. The programmed setting will be retained in memory even if the meter is powered off or the battery has been changed. If you press and release the SPECIES/MATERIAL button in the future, the last programmed setting will appear on the screen.

### **Relative Scale for Moisture Measurement of Non-Wood Building Materials**



As mentioned earlier, this mode can be entered by pressing and releasing the SPECIES/MATERIAL button until you are in this mode (display will show REL in lower left corner). Once in this mode, your meter will be in a relative measurement scale (0-100) for measuring non-solid wood or non-wood based materials. Press the ON/HOLD button to return to the Standard Measurement mode.



### **AUDIO Button**

Your Orion® 910 AUDIO button allows you to set a high moisture content alarm threshold (setting from 5% to 32%) for solid wood measurement

applications, and also set the volume for the audible alarm. This feature is useful, for example, when quickly scanning a piece of wood, and trying to locate any higher moisture content areas, without having to continually look at the digital display.

Press the AUDIO button and the display will show the current moisture content high threshold (e.g., 14%). The factory default is 15%. Each press and release of the UP or DOWN buttons will adjust the threshold setting by 1%.

To get to your desired setting faster, hold down the UP button for 0.7 seconds; the alarm threshold setting will increase to the next multiple of 5 (e.g., if the alarm threshold setting is currently 12%, the setting will advance to 15%). Every 0.7 seconds thereafter that the button is held down, the setting will change by another 5 units (e.g., from 15% to 20%). If the DOWN button is pressed and held for 0.7 seconds, the setting will decrease to the next multiple of 5 (e.g., if the alarm threshold setting is currently 23%, the setting will change to 20%). Every 0.7 seconds thereafter that the button is pressed and held, the setting will change by another 5 (e.g., from 20% to 15%).

Once the setting has been increased to the maximum programmable MC% threshold (32%), the setting will wrap around to the minimum (5%) and continue to increase from there. Similarly, if the setting has been decreased to the MC% minimum (5%) the setting will wrap around to the maximum (32%) and continue to decrease from there. Again, the range of setting is 5% to 32%, in 1% increments (no decimal place).



Next, press the AUDIO button again, and you will be taken to a display that will show the current volume setting for audible sound. Simply use the UP or DOWN arrow buttons to set the desired audible level. The volume setting has a range of OFF to 9; 9 being the loudest and 1 being the quietest, with OFF

indicating that the audible alarm is disabled.

When finished, you can place your meter back to Standard Measurement mode by pressing the ON/HOLD button.

## **SUMMARY OF ORION® 910 FEATURES**

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- Adjustable backlit display while in wood or relative scale measurement modes
- Digital display resolution of 0.1% (in Standard Measurement mode)
- MC measurement range for wood 4.0% to 32.0%
- Relative scale for testing non-wood building materials
- Programmable settings for a wide range of softwood and hardwood species
- Large moisture measurement sensor area
- Current reading can be frozen on display screen, great for note taking
- Low battery alert indication
- Audible alarm for programmable high moisture content limits
- Programmable audio alert volume
- Can be field-calibrated with the included Orion® On-Demand Calibrator
- Protective rubber boot
- Hard shell storage case and a 9-volt battery are included
- 7-year warranty
- IntelliSense™— Read beyond surface conditions
- Automatic shutoff when not in use

## **Backlit Display**

Orion handheld moisture meters now have backlit displays. The backlight can be enabled and the intensity (25%, 50%, 75% or 100%) set by using the UP and DOWN arrow keys. The backlight can be adjusted in the wood or relative reading modes. If enabled, it can be used in all screens.

## **Low Battery Alert Indication**

When the battery begins to get low, a small battery icon indicator appears in the upper right-hand corner of the display. If the 9-volt battery is not replaced soon after, a critical level will be reached and the text “BAT” will be flashed three times on the screen followed by the meter shutting down immediately. This shutdown action is to prevent inaccurate readings.



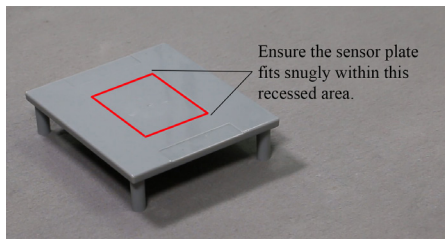
## **Auto Shut-Down to Preserve Battery Life**

Regardless of which mode the meter is in, if there is no change in measurement activity over a period of 1 minute, the meter will automatically turn off.



## Calibration of Your Orion® 910

If you have reason to believe your Orion® 910 may be out of calibration, it can be easily recalibrated using the provided On-Demand Calibrator. Before calibrating your meter, please be aware that you must **ONLY** calibrate to the correct Calibrator that came with the meter. Serial numbers on the Calibrator (found underneath) and meter (found in the battery compartment) **MUST** match for correct calibration. Also, the sticker must not be damaged, as this may cause incorrect calibration. Follow the steps below for proper calibration. The instructions are also printed on the back of the Calibrator. Place the Calibrator on its legs on a non-metallic surface.



Turn the meter on, and then use the SPECIES/MATERIAL button to put your meter in CAL mode. (Refer to the SPECIES/MATERIAL button section of the manual.)

Place the meter on the Calibrator, correctly “seating” the meter sensor pad firmly on the recessed area of the Calibrator. **IMPORTANT:** Failure to correctly and firmly “seat” the sensor pad in the recessed area will cause an inaccurate calibration.

Apply light downward pressure and press the AUDIO button three (3) times. The meter will make a “beeping” sound which indicates it is going through the automatic calibration procedure.

When the calibration procedure is complete, the meter will display the word LIFT. Immediately remove the meter from the Calibrator and hold the meter in the air for approximately 5 seconds until the word DONE appears on the display. During this last phase in the air, be sure to keep your hand and other objects away from the underside of the meter.

Press the ON/HOLD button to return the meter to Standard Measuring mode.

To restore your meter to the original factory default settings, including the original calibration, press and hold the ON/HOLD button for approximately 10 seconds, until the word CAL appears on the display, then release the ON/HOLD button.

If, after recalibrating the Orion® 910, there is still a problem with the meter, please contact a Wagner representative for further instructions at 844-689-0660.

### **Protective Rubber Boot for Your Orion® 910**

In an effort to help avoid damage resulting from your Orion® 910 meter being dropped or banging the edges against other hard objects, Wagner Meters has provided a fitted rubber boot which fits snugly around the perimeter of your Orion® 910 meter. This protective boot should remain in place at all times even when calibrating your meter on the On-Demand Calibrator.\* All



function buttons as well as the display screen, sensing plate, and battery compartment are accessible without removal of this rubber guard. The boot will fit on the meter only one way correctly. Failure to correctly place the boot will result in inaccurate readings.

*\*Although not recommended, you may wish to use the meter without the protective rubber boot. If you choose to do so, make sure you recalibrate your meter on the On-Demand Calibrator with the boot off.*

### **7-Year Warranty**

Wagner Meters offers an industry-best 7-year warranty on your Orion® 910 moisture meter.



*Register your meter at [www.genuinewagner.com](http://www.genuinewagner.com)*

### **Wagner's IntelliSense™ Technology**

Your Orion® 910 moisture meter features Wagner's IntelliSense™ technology, going beyond the surface conditions for accurate measurements of moisture conditions inside the wood.

Most pinless meters are unable to distinguish between surface or ambient conditions on the surface of the wood, and the real moisture picture in the wood. Pin-type meters may be able to bypass the surface conditions, but they also damage the surface of the wood each time you take a reading. Air humidity, condensation, or other ambient conditions can impact many moisture meters and give inaccurate readings that cost you money. However, Wagner Meters' hand-held moisture meters with IntelliSense™ technology measure moisture IN the wood,

not ON the wood, giving fast, highly accurate moisture measurement for woodworking or wood flooring projects. In addition, it works without damage to the wood surface!

## **SPECIFICATIONS**

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### **Deep Depth Measurement**

- Appropriate for reading into the wood to .75" (19mm)

### **Dimensions with Boot**

- Length: 5.75 inches (146mm)
- Width: 3.0 inches (76mm)
- Thickness: 1.0 inches (25mm)

### **Scanning Area**

- 2.0 inches (50mm) x 2.5 inches (63mm)

### **Weight with Boot**

- 7.2 oz. (204g)

### **Power**

- 9-volt battery (Wagner recommends using non-rechargeable Alkaline or Lithium or rechargeable NiMH batteries)

### **Auto Power Shut-Down**

- 60 seconds

### **Measurement Ranges**

- MC range for wood: 4.0% to 32.0%

### **Specific Gravity Range for Wood Species**

- 0.20-1.0 SG

### **Storage Temperature and Humidity**

- +50°F to +90°F (+10°C to +32°C), Maximum relative humidity of 95%, non-condensing

### **Operating Temperature**

- +32°F to +110°F (+0°C to +43°C)

## **CHANGING THE BATTERY**

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As indicated earlier in this manual, if BAT appears on the display, the battery must be changed immediately or any further moisture measurements will be inaccurate. Replace with 9-volt, non-rechargeable Alkaline or Lithium or rechargeable NiMH batteries. Be sure to observe proper battery polarity. The battery fits very snugly in its compartment and will not become dislodged while taking measurements. Reattach the compartment door carefully so that it snaps back in place.

## **METER STORAGE**

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When meter is not in use, we recommend that it be stored in the hard shell carrying case provided with each Orion® 910 meter. If meter is to be stored for a period longer than 30 days, remove the 9-volt battery.

## WARRANTY

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Wagner recommends that you register your moisture meter at [www.genuinewagner.com](http://www.genuinewagner.com) for faster support and benefits.

Wagner Meters' warranty offers this product protection against defects in material and workmanship for seven (7) years from the date of purchase on all Orion® 910 moisture meters, subject to the following terms and conditions:

Wagner Meters' liability under this warranty shall be limited, at Wagner Meters' option, to the repair or replacement of this product or any part thereof, which is demonstrated to be defective. To exercise this warranty, visit [www.genuinewagner.com](http://www.genuinewagner.com) for instructions. This limited warranty does not apply if Wagner Meters determines that the product has been damaged by accident, negligent handling, misuse, alteration, damage during shipment, or improper service not attributed solely to the actions of Wagner Meters. Wagner Meters' liability for any defect in material or workmanship in this product shall be limited to the amount of purchase price of the product.

With proper care and maintenance, the meter should stay in calibration; however, because Wagner Meters has no control over the manner in which the unit will be used, it makes no guarantee that the meter will stay in calibration for any specific period of time. Wagner Meters recommends returning the unit to the factory for a diagnostic checkup in the event the meter is dropped or otherwise damaged. If the meter is suspected to be inaccurate, using the provided On-Demand Calibrator and performing a recalibration will ensure the meter is reading correctly. If the meter fails to calibrate properly then it should be sent to the factory for a diagnostic checkup.

When instructed to return a meter, the meter should be returned with the Calibrator that

matches the serial number of the meter.

This warranty is in lieu of all other warranties, whether oral or written, express or implied. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION OF THE FACE HEREOF. **WAGNER METERS HEREBY DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.** Under no circumstances shall Wagner Meters be liable for any incidental or consequential damages. Agents and employees of Wagner Meters are not authorized to make modifications to this warranty or additional warranties binding on Wagner Meters. Accordingly, additional statements, whether oral or written, except written statements from an officer of Wagner Meters, do not constitute warranties and should not be relied upon by the customer.

This warranty is personal to the customer purchasing the product from Wagner Meters or Wagner Meters' authorized distributors, and is not transferable.

### **Technical Support/Repair Contact**

Worldwide Toll-Free: 844-689-0660



**Wagner Meters**  
**326 Pine Grove Road**  
**Rogue River, OR 97537**  
**Worldwide Toll-Free: 844-689-0660**

**WWW.WAGNERMETERS.COM**

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