Employing a Laser Rock Measure Plus (LRM+) to obtain input readings for the "Curl Distance" App

LRM Plus Compatibility with the Curl Distance App

To use the App for "Last Stone Draws" the distance is measured either from the centre of the house (the Tee) to the nearest point of the stone or, if the stone covers the centre, from two points 2ft away from the centre.

The app calculates the real distance from the centre to the centre of the stone in both cases, using the official formula from the World Curling Federation WCF. Values can be entered for up to six sheets.

Data entry can either be in metrics (cm and/or mm) or in imperial (inches and 1/100 of inches).

The above is extracted from the website of the Apps creator Curlit Technologies.
https://curlit.com/products2-2

Figure 1 shows the key elements of LRM Plus that are involved in the initial set-up that should be completed before making any measurements. The LRM Plus is calibrated during its assembly so when the base of a LRM Plus is flat on the ice surface its laser beam is parallel to the ice surface. This assures that the laser beam striking height on a rock will be the same no matter where the rock is located. The Initial Set-up Procedure given below assures the base is flat on the ice surface.

Also the measuring point for the laser device is set back exactly 15 cm from the dead centre of the set screw. This 15 cm set back should be entered and locked in the Settings Menu of the Curlit Distance App so that it need not be subtracted from a reading that is entered in the App. This procedure will be covered later in the Setting Up the App section of this document.
An LRM Plus is ideally suited for making the measurements required by the Curl Distance App.

Figure 1

Initial Set-up Procedure when there is a metal pin in the Tee and the 2ft measuring points are 3/8-inch holes drilled in the ice

1. Loosen the locking nut and turn adjustable set screw counter-clockwise until it will not touch the pin when the LRM is placed flat on the ice surface.
2. Position the LRM so that the set screw is over the pin and then turn the set screw clockwise until it just touches the pin. Be sure the set screw does not lift the end of the LRM off the ice as this would cause the laser beam to not be parallel to the ice surface.
3. Place a rock at outer edge of the house and turn on the laser beam (see Making Measurements section below). Note height where the beam strikes the hitting band of the placed rock and then move the rock into the four foot ring and observe where the beam strikes the hitting band. The height of two striking points should be within the hitting band of each rock, if they are not it means that the laser beam is not parallel to ice surface. To correct this, repeat Steps 1 and 2.
4. Tighten the locking nut. Note - “finger tight” is usually adequate to hold the set screw in position
5. Then the LRM Plus should be inserted in the 2ft measuring points (3/8-inch holes) to confirm that there is a firm fit with the set screw at the depth needed to engage the metal pin in the Tee. If there isn’t a firm fit, you could request that the ice technician increase the depth of the metal pin at the tee until set screw achieves a proper fit in all measuring points.

Initial Set-up Procedure when the Tee and the 2ft measuring points are 3/8-inch diameter holes drilled in the ice

1. Loosen the locking nut and turn adjustable set screw until it extends at least 3/8 of an inch below the bottom of the base. Then tighten the locking nut. Note - “finger tight” is usually adequate to hold the set screw in position.
2. The LRM Plus can now be placed in any of the holes and the base will always be flat on the ice surface which means the laser beam will be parallel to the ice surface. Therefore the beam will strike rocks anywhere on the ice at the same height.

Setting the display on the LRM Plus to obtain Millimeter Readings

It is more straight forward to enter readings in the Curl Distance App in millimeters. This can be done by setting the Laser to display readings in meters and ignoring the decimal place.

To set the display to meters refer to Figure 2 and proceed as follows: -

With the Laser turned off, press the **"C"** button which will turn the device on.

Then press and hold down the **"Func"** button until **"ft/m"** shows at the top of the circle in the display and release the **"Func"** button.

Press **"Func"** button again to bring-up the **Units** circle display.

Then use the **"+"** or **"-"** buttons to bring **"0.000 m"** to the top of the circle and then press the **"Func"** button.

The LRM Plus will now display readings in meters and decimal fractions of meters as shown by the readings in Figure 2. The LRM Plus will remain in the meter reading display mode after being turned off and turn on again, so performing the steps above should not be necessary between draws.

Note – to turn the LRM Plus off depress and hold the **"C"** button until the display goes dark.

Figure 2

Making Measurements with the LRM Plus

After carrying out the appropriate actions in the previous sections proceed with following to make a measurement: -

1. Position the LRM Plus so that the set screw is in the Tee or a 2ft hole.

2. Depress the **"C"** button to turn LRM Plus on.

3. Direct the beam at rock to be measured.

4. Slowly sweep the laser beam across and then back across the face of the rock.

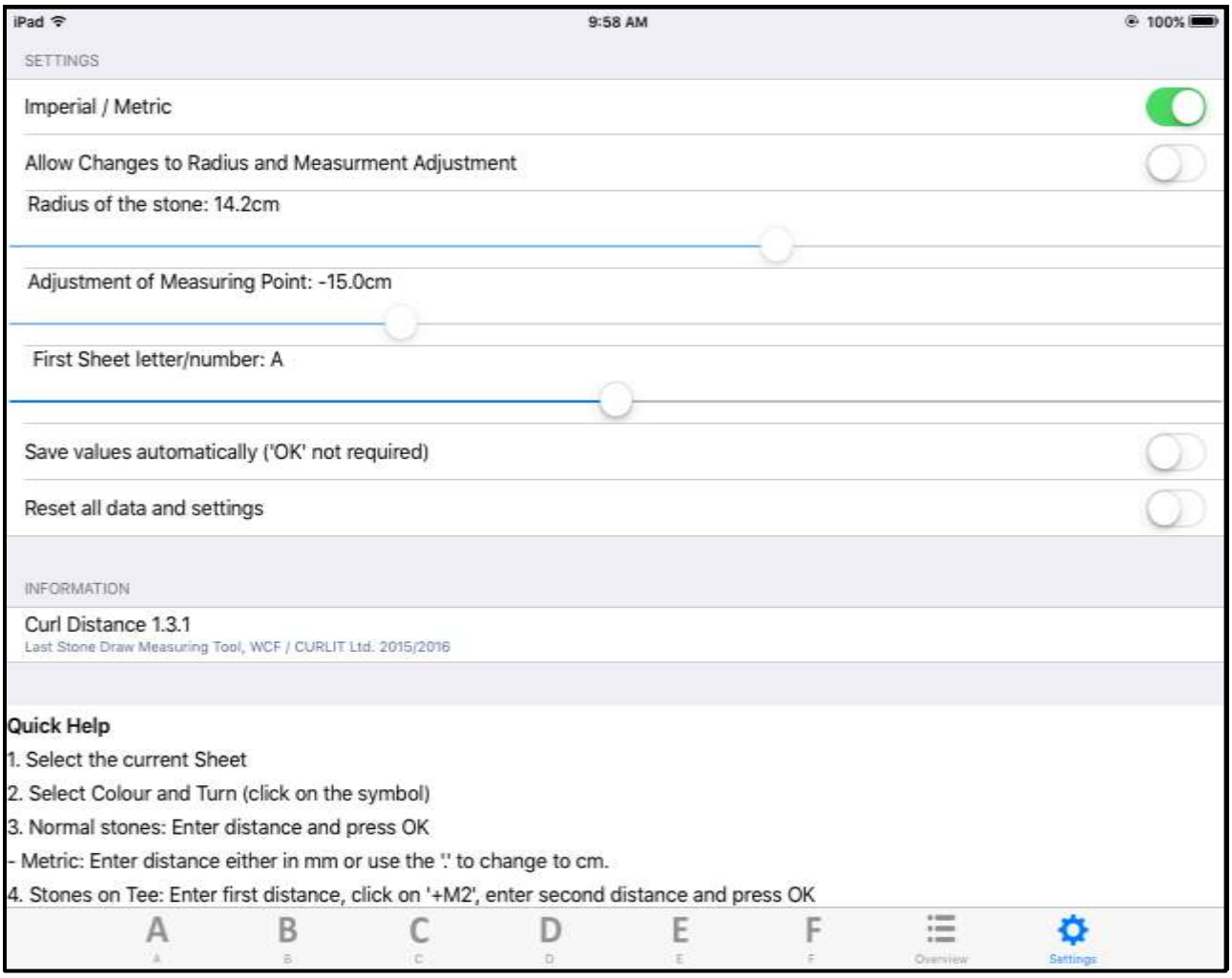
5. Then depress the **"measure button"** (red button with white triangle) to freeze the readings.

   - the top reading (min) on the display (in Figure 2, 0.340 m or 340 mm) is the shortest distance from the measuring point and the rock face. This is the value to enter in the Curl Distance App on the Tablet remembering to ignore the decimal point in the reading. Ignore the other readings on the display.

6. Turn off the LRM Plus by depressing the **"C"** button before making another measurement.

Setting Up the Curl Distance iOS App for the LRM Plus

The screen shot below shows the Settings Page for the App and can be reached by tapping on Settings on any page of the App. This is the starting point for the use of the App and the parameters on this page should be set before any measurements are made.



The Settings should be set as given below: -

The **Imperial/Metric** switch should be turned on showing Green. The App will then operate in the metric mode.

The **Allow Changes to Radius and Measurement Adjustment** switch mustbe turned on to adjust the Rock Radius, the LRM Plus Measuring Point (Set Back) and the First Sheet letter/number. Once these settings have been made the switch should be turned off showing no colour which locks the settings covered below at their shown values.

The **Radius of the Stone** slider should be positioned to show a stone radius of 14.2 cm. This setting is the WCF's recommended stone radius.

The **Adjustment of the Measuring Point** slider should be positioned to show -15.0 cm which is the set-back of the LRM Plus.

The **First Sheet letter/number** slider should be positioned to correspond to the way the first sheet is designated on the curling surface.

The **Save Values Automatically (‘OK” not required)** switch should be turned off showing no colour.

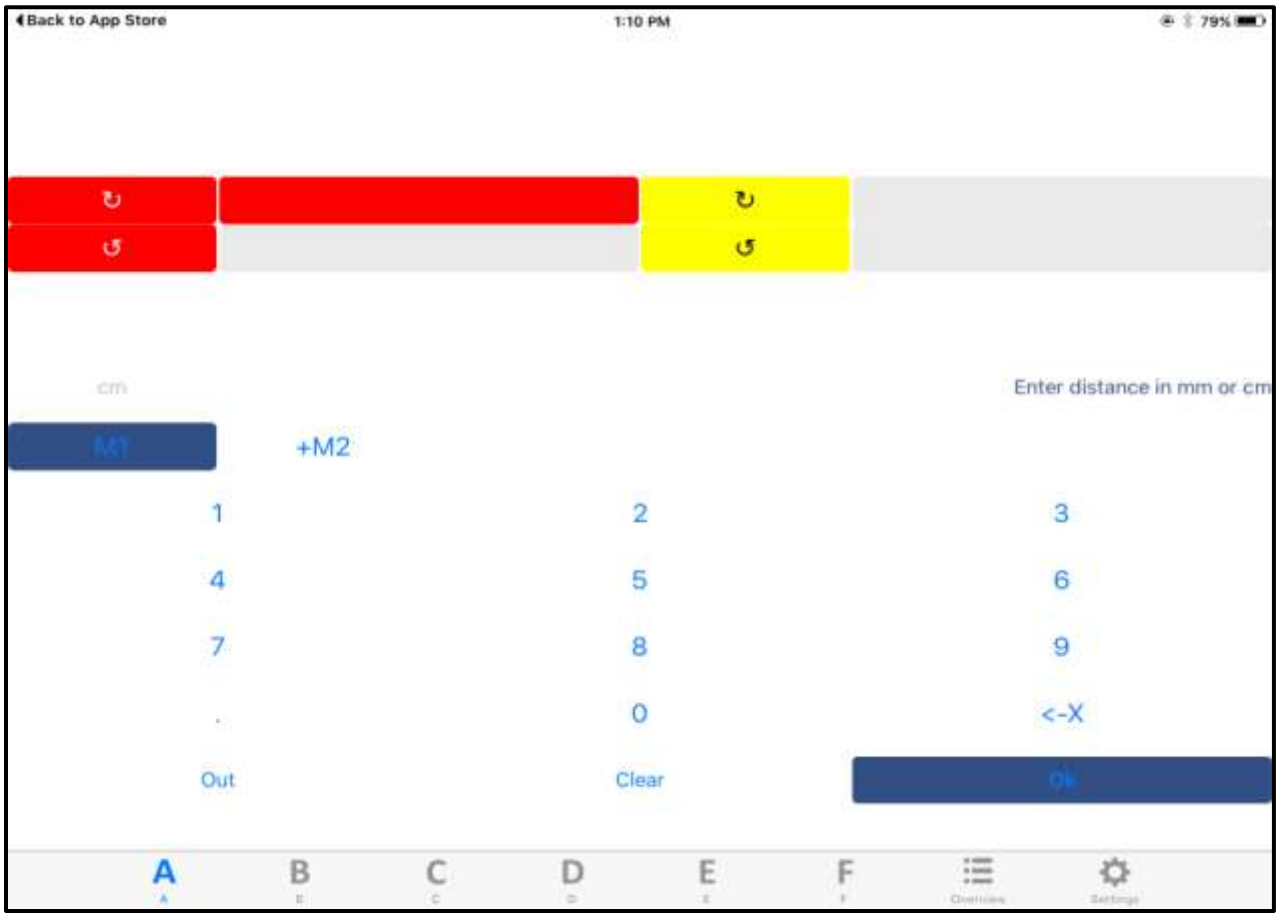
The **Reset all data and settings** switch should be turned off showing no colour.

Once the above steps have been implemented the **Settings Page** should look like the screen shot shown above.

Entering LRM Plus readings in the App

The screen shot below is a blank measurement entry page for Sheet A. To enter a measurement for a rock not covering the Tee first you must tap on the button corresponging to the rock colur and turn that you wish to enter. Then tap the M1 button and enter the LRM Plus measurement in millimetres on key pad after which you tap the OK button to enter the value. The distance between the rock’s centre and the Tee is displayed to the right of select rock button.

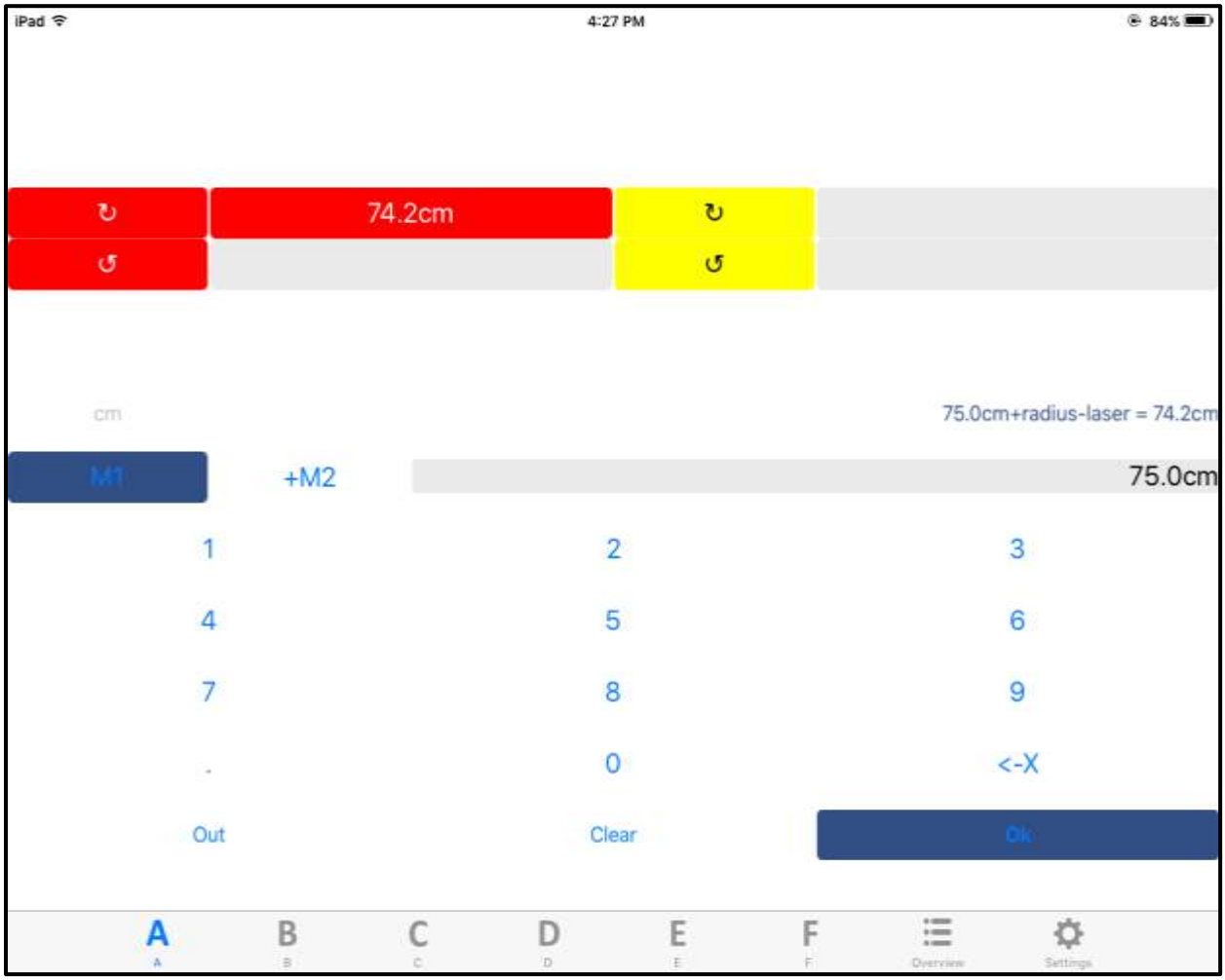
If a the rock is covering the Tee, a measurement from each of the 2ft measuring points on the edge of the four foot circle must be made. Start by tapping the rock colour and turn that you wish to enter. Then select the M1 button and enter the first RLM Plus measurement in millimetres. Then tap the +M2 button and enter the second measurement on the key pad followed by tapping the OK button. Note that the App converts millimetre measurements into centimetres for display when the OK button is tapped.



Screen Shot for a Rock not over the Tee

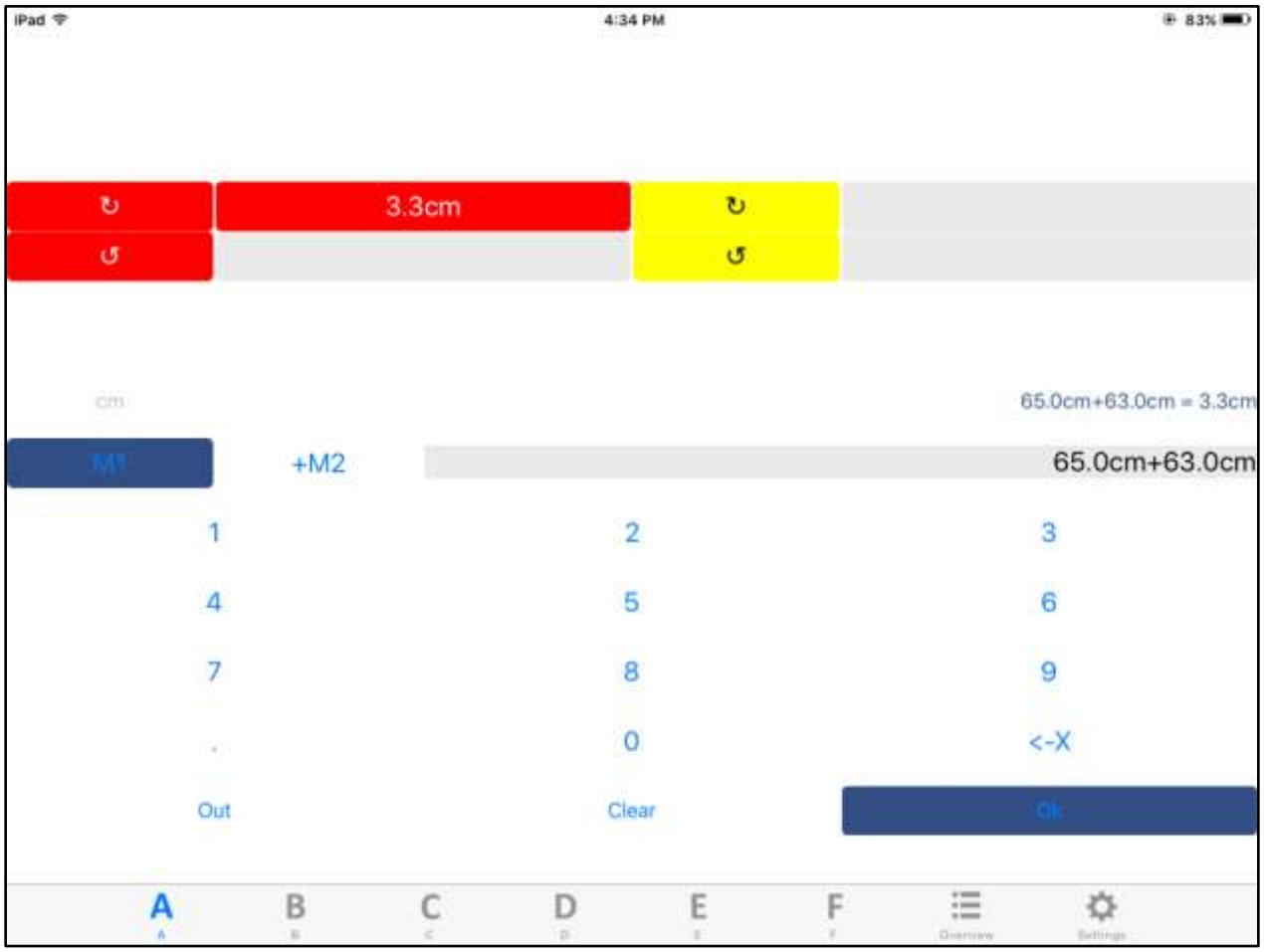
In the screen shot below, the rock being measured does not cover the Tee and a single LRM Plus measurement from the Tee of 750 mm was entered for M1 using the procedure described in the paragraph for the previous screen shot. The screen below displays the distance the centre of the Red Rock with Clockwise Turn is from the Tee. As shown on this screen shot the displayed distance is the LRM Plus measurement plus the rock radius minus the LRM Plus set-back.

To assure accuracy for rocks in all locations that don't cover the Tee, it is important to use a single LRM Plus measurement from the Tee and enter it as M1 in the App.



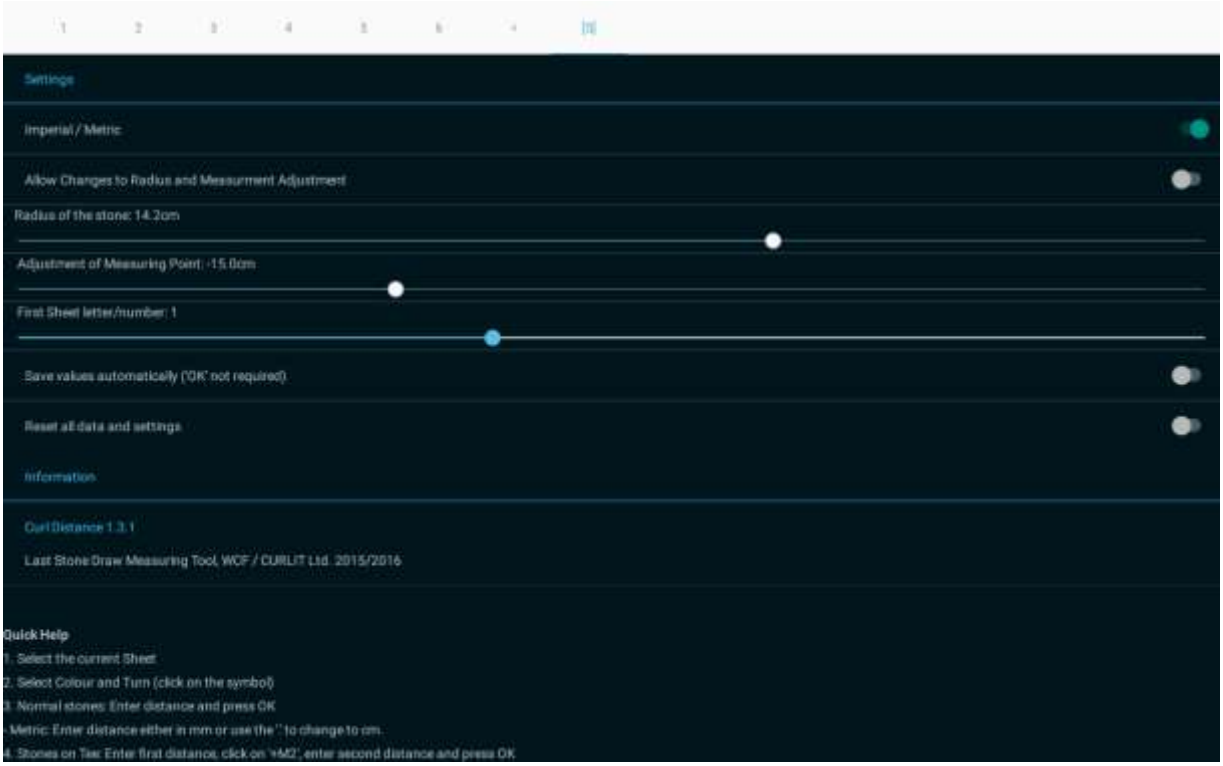
Screen Shot for a Rock covering the Tee

In the screen shot below the Red Rock thrown with Clockwise Turn stopped over the Tee and two measurements are need to determined the distance of its centre from the Tee. These LRM Plus measurements are taken from the 2ft measuring points on the edge of the four foot circle which are located at the centre line and the tee line. The first measurement 650 mm was entered on the key pad for the M1 button.Then the second measurement 630 mm was entered on the key pad for the +M2 button and the OK button tapped. The order in which these measurements are entered does not matter. In this example 3.3 cm is the distance the centre of rock is from Tee.



Setting Up the Curl Distance Android App for the LRM Plus

The screen shot below shows the Settings Page for the App and can be reached by tapping on [S] at top right of any page of the App. This is the starting point for the use of the App and the parameters on this page should be set before any measurements are made.



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The **Save Values Automatically ('OK" not required)** switch should be turned off showing no colour.

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Once settings are complete, touch "A" at top left to open the measurement page.

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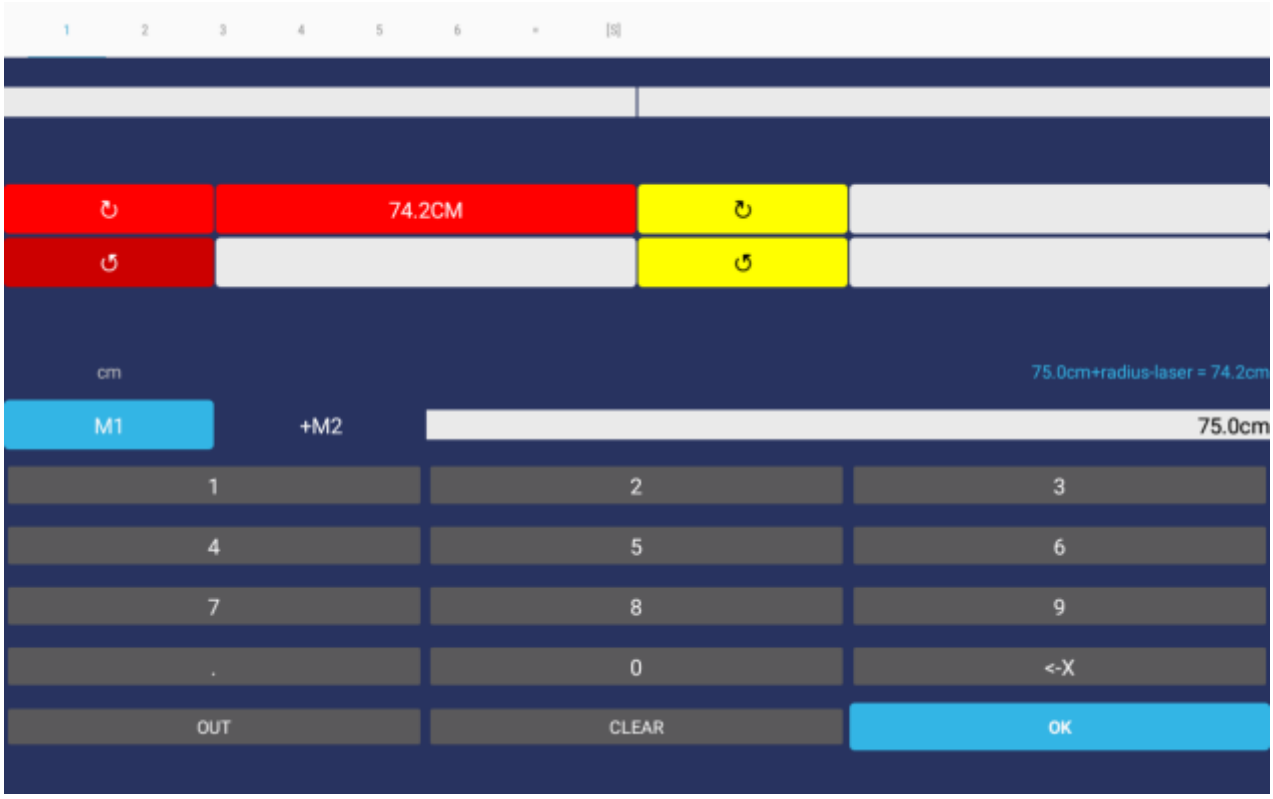

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