

Using The Leica Disto E7500i Laser Distance Measurer To Measure The Field Events

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Advantages Of Using The Leica Disto To Measure The Field Events:

- 1) Eliminates the need for a tape puller
- 2) Speeds up measuring of the event
- 3) No tape measure laying in sector
- 4) Consistent measuring for all athletes, i.e., no tape stretching
- 5) Horizontals—less officials at board, therefore more fan & coach friendly viewing

Features Of The Leica Disto E7500i:

- 1) Water resistant—can use in rain
- 2) Drop resistant to 6 feet
- 3) Bluetooth connection to [hone, iPad, etc...as long as Disto Sketch app is installed (can only connect to 1 device at a time)
- 4) Builtin camera with crosshair to see what you are focusing on, also has 2X & 4X zoom
- 5) Keeps last 30 measurements in memory
- 6) 30 second auto shutoff
- 7) Can compensate for vertical angle to give a true horizontal measurement.
Cannot be used to triangulate because it cannot compensate for horizontal angle.
- 8) Can input an offset to deduct the distance of the Disto to the measuring point (edge of circle or takeoff board) from the total measurement, giving you the true measurement of the throw/jump

A couple of things to remember about the Leica Disto E7500i:

- 1) The unit has an automatic shutoff after 30 seconds of no use. If you have connected via Bluetooth, you will need to reconnect (sometimes, you may have to turn Bluetooth off on the Disto off then back on to reset it). Bluetooth setup at back of article.
- 2) The default device measuring position is from the back of the device—i.e., if the unit auto shuts off the position reverts to the rear of the device. If you have set it to measure from the front or from the tripod pivot, you will have to set it again if the unit auto shuts off.
- 3) The screwhole on the bottom-rear of the Disto corresponds with the axis of rotation on the tripod.



The Leica Disto at startup:

default setting of measuring from the rear of the device

set to measure point-to-point

Bluetooth on (will remain from last use)

full batteries

offset entered (will remain from last use)

measure metrically (will remain from last use)

left favorite button set to change measuring position (from back [default], from front, or from tripod pivot) (will remain from last use)

right favorite button set to measure true horizontal (will remain from last use)

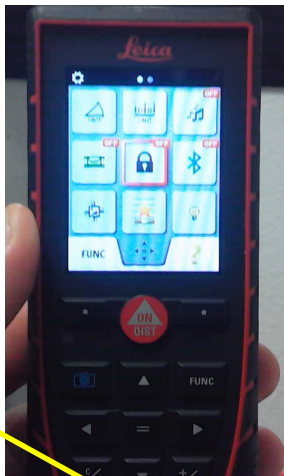
Determining Offset

- 1) If you input offset in imperial units, if you convert the measuring units to metric the offset will automatically convert to metric, and vice versa.
- 2) The bottom screwhole is 1 cm, or 3/8", from the rear of the Disto. The back legs to the center of tripod is approximately 21.8 cm, making the back of the Disto approximately 20.8 cm from the back 2 legs. Easiest way to determine offset is to use an old piece of a PV/HJ crossbar placed in the center riser of the tripod, and measuring from the edge of the ring/edge of toeboard (through the center of the circle (if measuring SP/Disc), or at a right angle to the toeboard (if measuring LJ/TJ), to the middle of the crossbar piece. If you want to keep the measuring point at the back of the device (in case of auto shutoff) add 1 cm or 3/8" to the offset.
- 3) Be sure to enter the offset as a negative number, else the offset will then be added to the total distance, rather than be subtracted. Also useful to determine/input offset in metric, then switch to using imperial units for the actual measuring (if needed).

Setting The Measuring Units—Metric & Imperial



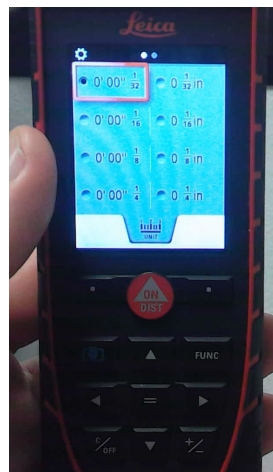
Press the “FUNC” key to get to this screen



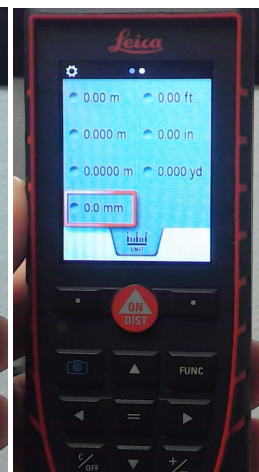
Press the gear key to get to this screen



Use the up arrow key to get to the “Unit” function. Press the “=” key to get to the function



Use the arrow keys to navigate to the desired measurement then press “=”. This is the Imperial page



This is the Metric page

Measuring Using The “True Horizontal”



This icon is known as “True Horizontal” (my naming convention). You can reach it by pressing FUNC on the homescreen, then the right arrow key, then “=”. It is a good idea to set this as one of your Favorite keys.



Angle at which measurement was taken

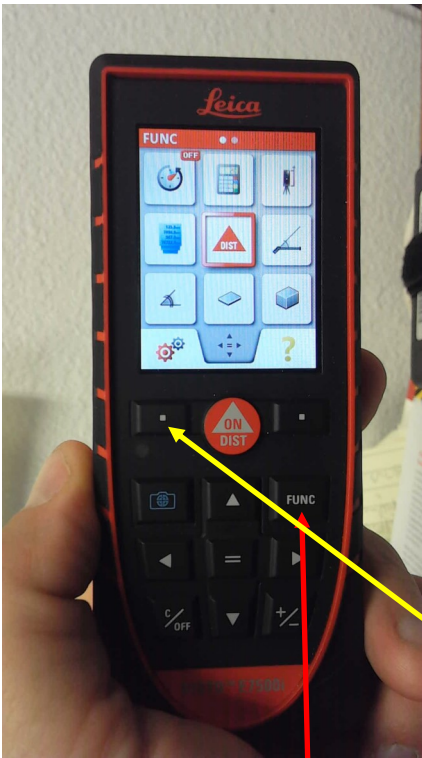
Point-to-point measurement

Vertical (or height, at 90° from Disto true horizontal)

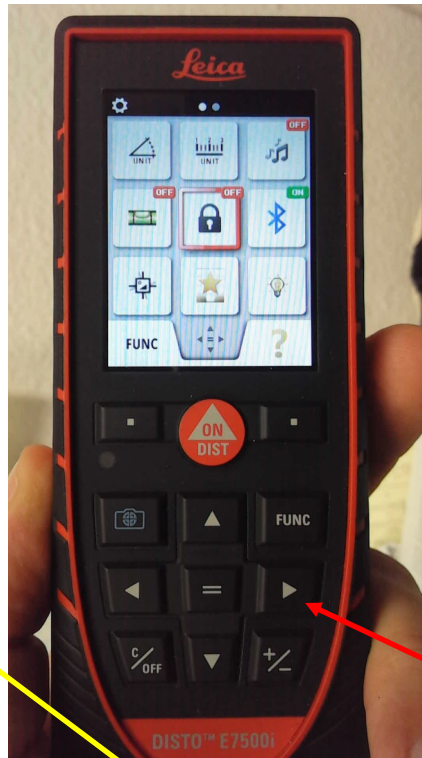
True horizontal measurement (Press “=” to get this measurement to replace point-to-point in app. For this measurement, initially, the app will show 22’ 5 1/2”, press “=”, then 21’ 8 3/4 will then show.)

note that the measurement shown corresponds with the bold line on the icon to its left, except for the true horizontal, whose icon is below

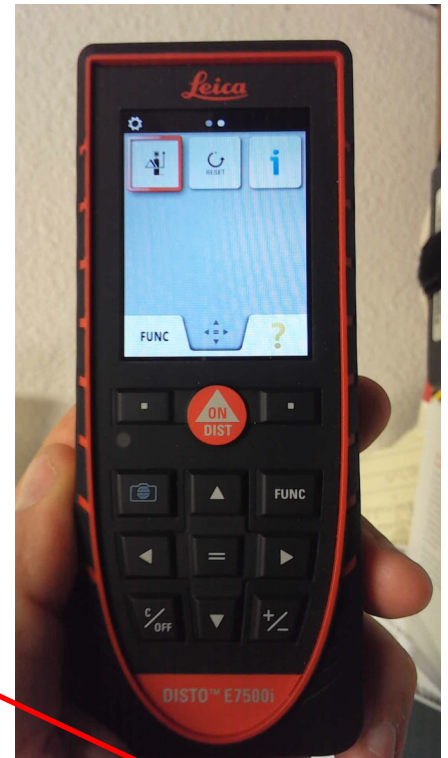
Inputting The Offset



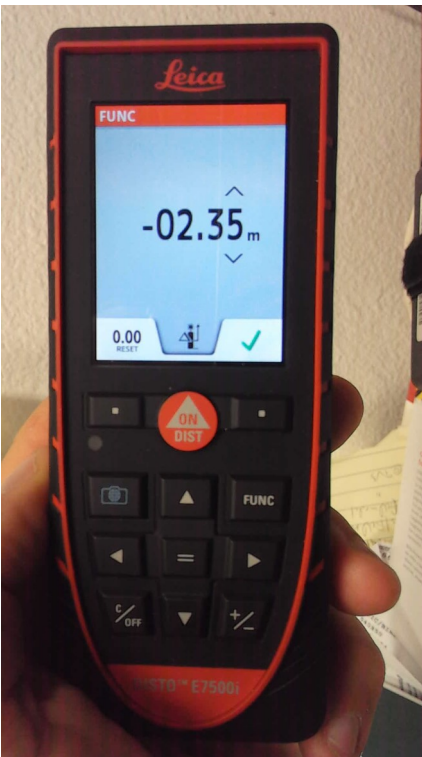
Turn on Disto & press "FUNC" key



Press the gear button to get to this screen



Press the right arrow button twice to get to this screen. This is the Offset icon. Press the "=" button to get to the input offset screen.



Use the up & down arrow to change the value, the left & right arrows to change which digit needs to be adjusted. Use the "+/-" key to make offset positive or negative. You can use the top left button to reset the offset to 0, the top right button when you are done.

1) It is best practice to measure the offset from the back of the unit, mainly for when the unit auto shuts off. The only time you would want to use the center pivot is when you are placing the center of the tripod over the center of the ring and rotating the tripod head left & right to hit the reflector. This method is not recommended because it will cause you to have to enter the ring (thereby introducing debris into the ring) and having to make marks inside of the circle of where to place the tripod legs. If measuring while pivoting (method just mentioned or measuring javelin) you can still have the offset set to the back of the device because the "tape" will still extend through the back of the Disto when tripod head is rotated.

2) The offsets can then be reused for further events, provided you keep the same number of tripod leg extensions each time. Raising or lowering the legs will affect the offset. Raising the height of the tripod via the crank will not affect the offset. Make sure you determine the offset for each different ring you measure from, not all rings are alike.

3) Be sure to input offset as a negative number, else the offset will be added to the total measurement, rather than be subtracted.

Setting The Favorite Keys:

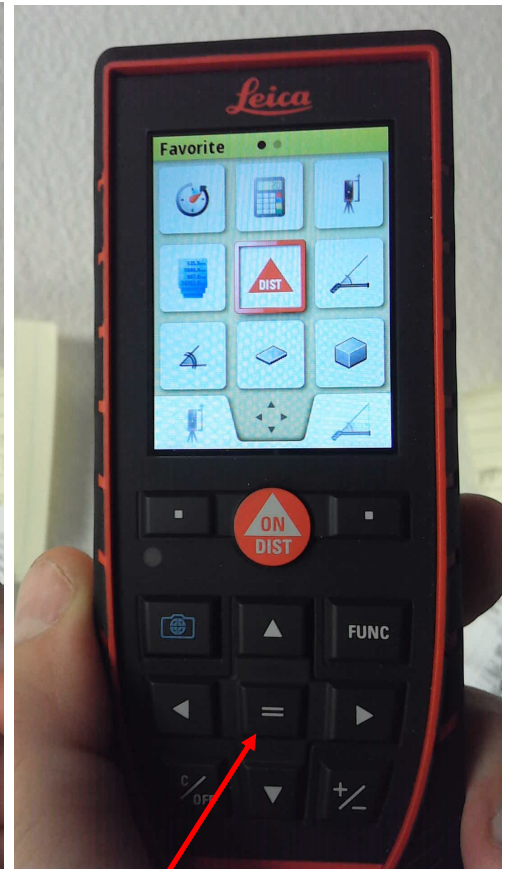
You can set the two favorite keys (the top right & top left buttons, each with a square in the middle of it) for quick access to functions without having to press the "FUNC" key to get to them. You can only set the functions from the first page (pressing "FUNC" key) - you cannot set functions from 2nd page (pressing "FUNC" key then the gear key)



Press the "FUNC" key then the gear (top left, or the left Favorite) key to get to this screen.



Press the down arrow key to get to the icon with the gold star (the Favorites icon)



Press the "=" button to get to this screen—notice the yellow bar & "Favorite" on the top of the screen

With the yellow bar at the top, use the arrow buttons to scroll to the function icon you want to set as a favorite, then press whichever Favorite key (top right or top left key, the one with a white square in the middle of it), then press 'C/Off' (lower left) twice to get back to the main screen. Some of the more useful icons to set as a Favorite:



Set measure point (front, back, tripod swivel)

Measure True Horizontal (if Disto is tilted to hit reflector it will give you the True Horizontal measurement)

Recall last 30 measurements (the Disto keeps the last 30 measurements in memory, this allows you to recall them, use arrow keys to flip through them)

You can use the right arrow key to go to the next page to select one of those icons as a favorite, but there aren't any on the 2nd page that are useful to our purpose

Reflector

- 1) try to use a reflector that is close to the ground—this will keep the measurement as true as possible. If the reflector is off the ground, say at waist level (meaning you can use the point-to-point measurement rather than the True Horizontal measurement on the Disto) the marker in the field will have to keep the reflector very steady, else you could have a 1-2 inch sway in the measurement. It is a lot easier to keep the actual reflector from swaying when it is closer to the ground.
- 2) Make sure the reflector has a border of a bright/contrasting color to make it easy to find—it is easier to see the laser in the Shotput/LJ/TJ, harder to see in the longer throws (Disc/Javelin/Hammer).

Setting Up The Tripod For The Rings

- 1) On the bottom of the tripod, screw the rubber donuts all the way in so only the metal tips protrude.



- 2) Extend the top leg out, as these are thicker & therefore more sturdier. You can use the telescoping crank to raise the Disto if needed (especially for taller people) as this will not affect the measurement—**changing the height of the tripod by extending the legs or making them narrower will affect the offset!!!!**



- 3) Make sure you have the true center of the ring marked, either by using a punch tool or a mark from a Sharpie. Pull a tape measure (preferably a certified steel tape) from a mark in the field through the center & the back of the ring. The reflector should be at the mark in the field, the tape should be in the middle of the reflector. Set the tripod where 2 legs are abutting the back of the circle, & the remaining leg will fall onto the tape measure (meaning that the tripod is now setup to measure through the center of the ring & hit the middle of the reflector).
- 4) Rotate the head of the tripod to make sure the Disto is pointing at the middle of the reflector, lock down the left-right rotation by tightening the knob. Make a mark (using a metallic Sharpie, nail polish, etc...whatever can leave a permanent mark on the black tripod surface) where the tripod rotates left & right, so that if the head is ever moved, you can return it to its original position in line with the front leg. It is OK to move the tripod head up & down to focus on the reflector. Moving the head left & right to find the reflector will provide a false measurement, therefore the left-right movement needs to be secured.
- 5) Remember that the Disto E7500i is equipped with a camera that you can see through the screen on the Disto exactly where the laser is pointing (it also has a crosshair that is viewable). There is a 2X & a 4X zoom with the camera, use the up arrow key to zoom in. Using the camera does use extra battery life.
- 6) If using a reflector close to ground: for Shotput, you need to use true horizontal measuring. For Discus/Hammer, if the throws are consistently over 150' you can get by with using the point-to-point measuring—at 120', I've seen 1/2" discrepancy in the P2P & the true horizontal measuring. When in doubt, use the True Horizontal measuring function.

Measuring The Shotput/Discus/Hammer

(assuming you have a reflector close to ground, offset calculated to back of device)

Determining the offset: Set the tripod up as in numbers 3 & 4 on previous page (page 5). Use a plumbob or a piece of broken crossbar in the hollow metal centerpiece of tripod to measure the offset to the center of the tripod (offset=the distance from the edge of the ring to the center of the tripod). Add 1 cm (or 3/8") to the distance from the edge of the ring to the center of the tripod & that is your offset set to measure to the back of the Disto for that ring (discus—approximately 2.20 m, shot/hammer—approximately 1.80 m). Each ring is a different diameter (yes, it's true) so your offset may be different for each different ring you measure from. You can try to put the reflector on the edge of the ring & use the True Horizontal measurement to determine the offset, but sometimes it is too steep of an angle which will read an error on the Disto. Be sure to shoot some different measurements & then measure with a steel tape to verify that the offset is correct (using a nylon tape could be off due to the stretching of the tape). I have also seen rings that are not uniform in their diameter, due to construction issues or wear & tear through the years.

If you have a straightedge or yardstick, an alternate way to find the offset is to place the tripod in the ring as above, put the straightedge abutting the back two legs of the tripod, & measure the distance from the straightedge to the measuring edge of the ring. Subtract 20.8 cm (approximate distance from the rear of the Disto to the back legs) from that measurement & you will have your offset. Make several test measurements to verify that the offset is correct.

After the throw has been made, approach the back of the ring, rest the back two legs of the tripod against the back of the circle, align the front leg visually with the center of the reflector. **Hint:** use the camera function, along with the 2x & 4x zoom (by using up & down arrows) to align the crosshairs with the middle of the reflector. Make sure the Disto is on True Horizontal, press the red "On/Dist" button once to activate the laser, once more to get the measurement. *If using Bluetooth, be sure to press the "=" button to get the True Horizontal measurement to the device connected to it.* Be sure to turn off camera after measurement to conserve battery life.

Alternate method: make sure the true center of the ring is marked. Place the tripod over the center of the ring, using a plumbob or piece of broken crossbar inserted into the hollow middle center piece, making sure the plumbob or crossbar piece is directly over the center of the ring. Calculate offset to the back of the device & input it in, (using the technique above & making sure it is a negative number), mark where the three legs of the tripod are in the circle (use a Sharpie? - this will allow for consistent measurements every time). Now, with the proper offset entered, when the tripod is placed in the ring after the throw you may rotate the tripod head right & left to locate the reflector, still using the True Horizontal measurement. **Advantages:** can get measurement a little quicker by not having to align the front leg with the reflector. **Disadvantages:** you are making marks inside the ring, you can introduce foreign materials (dirt, grass, moisture, etc.) into ring.

Measuring The Javelin

(assuming reflector is close to ground, offset calculated to back of the device)

Determining the offset: Hold reflector at the edge of the arc, & place the tripod with the center over the 8 m mark (the triangular mark where you pull the tape measure through), using either a broken piece of crossbar or a plumbob. Shoot a measurement using the True Horizontal measurement—***the offset must be set to “0” for this***. Input this as the offset into the Disto, be sure to make it a negative number. Take another measurement with the reflector at the edge of the arc & it should read “0”, if not, you will need to recalculate the offset. Mark where the three legs of the tripod are on the throwing surface (duct tape, Sharpie, etc...).

The center of the tripod must be over the 8 m mark—if it isn’t, when you rotate the tripod head left & right, the actual mark will be off. For the Javelin it does not matter where you put the legs (i.e., with the front leg pointing to the reflector) - the pivot point (center) of the tripod must be over the 8 m mark. The offset distance determined to the back of the tripod will remain the same provided the tripod center is over the 8 m mark.

After the thrower has passed you on the runway, place the tripod on the three marks, pivot the tripod head left or right to align with the center of the reflector. **Hint:** use the camera function, along with the 2x & 4x zoom (by using the up & down arrows) to align the crosshairs with the center of the reflector. Press the red “On/Dist” button once to activate laser, once more to get measurement. *If using Bluetooth, be sure to press the “=” button to get the True Horizontal measurement to the device connected to it.*

Be sure to turn off camera after measurement to conserve battery life.

Measuring The Long Jump/Triple Jump

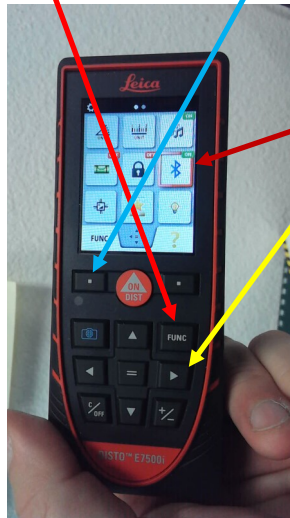
(assuming reflector is close to the ground, offset set to back of device)

Determining the offset: Set the tripod with the one leg forward (as set for the measuring in the rings, numbers 3 & 4 on page 4), & two back legs on a line perpendicular to the runway (a T-square or sheetrock square comes in handy here) where the offset will be 20 m from the front (measuring) edge of the board. Use a tape measure to approximate (i.e., eyeball) where the legs go, you can hold the reflector at the front edge of the board & shoot the distance via the Disto (using the True Horizontal measurement & offset set to “0”). Move the tripod front or back until the True Horizontal measurement reads “20.000 m”, making sure to keep the front tripod legs perpendicular to the runway. (You can also preset the offset to “-20.000m” and move tripod until the True Horizontal measurement reads “0” - then you will have the offset already entered into the device.) Mark a line using a straightedge across the runway (duct tape or Sharpie—remember to stay perpendicular to the runway), be sure to extend outside the runway to accommodate for measurements off to the side of the pit—if the runway surface extends off the sides of the runway, this is easy, if not, you may need to use paint on the grass. If you have a reflector wide enough to reach from the edge of the pit to the center, then you can get away with making a line only on the runway itself, or even making marks where the back two tripod legs go—whoever is marking in the pit with the reflector will need to be extra careful to keep the reflector perpendicular to the runway/pit, else the mark will be off. If you are jumping from multiple boards, you will need to do this for each board—communication between the Flight Coordinator, judge at board, & Disto measurer is crucial in this situation. Be sure to mark which line/marks go to which board.

Measuring the jump: As soon as the runner passes you on the runway, start setting the tripod in line with where the reflector will be placed (move tripod right & left to finetune location (keeping back legs on line), & use camera with zoom to find reflector [see Throws above]), or on the marks where the back legs go (when using wide reflector). Move the tripod head up & down (do not rotate right & left, measurement will be off), press the red “On/Dist” button once to activate laser, once more to measure. Be sure to be on the True Horizontal measurement. If using Bluetooth, press “=” to send it to the connected device.

Using The Bluetooth Function & Measuring

- 1) Download the Leica Disto Sketch app onto your phone, iPad, etc...It is a free download, do not use the Disto Transfer app as that is completely different.
- 2) Turn on Bluetooth on the Disto—press FUNC, then press the gear key, then the right arrow key to get to the Bluetooth function.



Use the “=” key to turn Bluetooth on or off.

- 3) You must connect to the Disto from the device through the Sketch app—**do not connect to the Disto through your device settings. If you do, the app will not work.**
- 4) If using point-to-point, the measurement from the Disto will appear in the bottom of the app.
- 5) If using true Horizontal, the measurement that first appears will be the point-to-point. To get the true horizontal to appear in the app, press the “=” key after the measurement is taken.



Angle at which measurement was taken

Point-to-point measurement

Vertical (or height, at 90° from Disto true horizontal)

True horizontal measurement (Press “=” to get this measurement to replace point-to-point in app. For this measurement, initially, the app will show 22' 5 1/2", press “=”, then 21' 8 3/4 will then show.)

note that the measurement shown corresponds with the bold line on the icon to its left, except for the true horizontal, whose icon is below



If using multiple Distos, press FUNC, then the gear key, then the right arrow key 4 times to get to this screen. The blue “i” should have the red box around it. Press the “=” button and the serial number of the device you are trying to connect to will be shown. This number should pop up among the selections when you are trying to connect to the Disto through the Sketch app.

You cannot connect multiple devices to one Disto. If you try to connect to a Disto that is already “paired”, you cannot connect & will not bump off the device already connected.

Remember that when the Disto auto powers off, you might/will lose Bluetooth connectivity with the device. You might have to turn the Bluetooth on the Disto off then on again.

Useful Numbers to know:

Distance from screw hole (corresponds with tripod center) on bottom of Disto to rear of Disto: 1 cm or 3/8”

Distance from center of tripod to rear legs: ~21.8 cm

Distance from rear of Disto to rear legs: ~20.8 cm

Offset for shot/hammer rings (to rear of Disto): 1.88 m (need to verify)

Offset for Discus rings (to rear of Disto): 2.26 m (need to verify)

Checklist For Using The Leica Disto

- 1) Batteries—plus spares
- 2) Reflector
- 3) Umbrella? (if outside, to reduce glare)
- 4) Center extension (to ground) for tripod?—if measuring javelin, or placing tripod in center of ring for other throws

When measuring the Shotput/Discus/Hammer By Placing Center Of Tripod Over Center Of Ring

- 5) Check offset—is it set to a different event
- 6) Offset: -1.077 m, if ring is true 2.134 m in diameter (or 7') for Shotput/Hammer, -1.26 m for Discus, if ring is true 2.50 meters in diameter (or 8' 2.5") [these both have the 1 cm added to measure to back of device]
- 7) Center extension for tripod
- 8) Center of ring marked

When Measuring Shotput/Discus/Hammer By Placing 2 Legs Against Back Of Circle

- 5) check offset—is it set to a different event?
- 6) Offset: -1.88 m Shotput/Hammer (if ring is true 2.134 m), -2.26 m in Discus (if ring is true 2.50 m), both these have the 1 cm added for measuring to the back of the device
- 7) Is front tripod leg set to point at target? i.e., will the front leg fall on the tape measure if both back legs are equidistant from tape measure & against back of ring

When Measuring The Javelin

- 5) check offset—set it to "0"
- 6) Center extension on tripod
- 7) Find offset by pacing tripod center extension over 8 m arrow (where measuring tape is pulled through), put reflector at inner edge of foul arc, shoot the True Horizontal measurement. If the 8 m mark is accurate, the offset "should" be 8.01 m.
- 8) Input this measurement (as a negative number) as the offset
- 9) Verify offset at a couple of other places on the foul arc, True Horizontal should read "0"

When Measuring Long Jump/Triple Jump

- 5) Is tripod head set with front leg (which points to reflector)?
- 6) Check offset—is it set to a different event?
- 7) Are offset lines drawn for each takeoff board to be used? [suggested—where offset (not the line) will be 20 m]
- 8) Verify offset by setting offset to "0", place back legs of tripod on line, place reflector on edge of board, shoot True Horizontal measurement. Input this offset as a negative number. Shoot True Horizontal again, should read "0"
- 9) Make sure the offset is the same for all offset lines to be used (i.e., when using multiple boards)
- 10) Runway—does surface extend off sides of runway to measure marks that are off to one side of the pit? If not, is reflector wide enough to reach mark & Leica?