

Vertex IV Manual

English



User guide Vertex IV

Vertex IV ENG rev 1.0, 2014-03-14

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Image shows the Vertex IV instrument, T3 Transponder, monopod staff with adapter.

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VERTEX IV

Congratulations to your choice of height measurer! The Vertex IV is a market leading ultrasound technology instrument, carefully tested and approved to be your reliable companion for years to come.

The Vertex IV is primarily designed to measure heights of standing objects, and most often trees. The instrument can also be used to measure distance, horizontal distance, angle and inclination. The Vertex IV its ultrasound measuring technique has proven to be especially useful in dense terrains with thick undergrowth, where conventional methods such as measuring tapes, laser instruments and mechanical height measurers are difficult to use.

To define a reference point in a secure and reliable way, the Vertex IV works with the transponder T3. The Vertex IV communicates with the transponder. This communication eliminates in an efficient way any mix-ups of signals from other instruments or places (echoes). A measurement operation will not, in any significant way, be disturbed by objects in between the Vertex IV and the Transponder T3. The reference point, i.e. the T3, is used as a sight mark for height measurements and can be placed at optional height, where visibility is the best in for example thick vegetation. The reference point height is set in the Vertex instrument and automatically added to the measured height.

The Vertex IV uses ultrasound to measure distances. Unlike for example measuring tapes and laser instruments, ultrasound can be used also when there is no free aim to the reference point. The ultrasound will not pass through an obstacle, but look for the shortest way around it.

Heights are calculated with the help of trigonometry, and the variables contained when measuring angle and distance. The Vertex IV will assume that the object to measure is perpendicularly positioned to the ground.

With the Vertex IV, an unlimited number of heights per object can be measured. The instrument display can show the four last measured heights per object at a time.

When working with a Factor Gauge method, a built in BAF function (Basal Area Factor) can be used for the Vertex IV instrument to control the minimum diameter for trees. The function is useful when some trees in an area are covered by others, making the decision on whether to include the tree or to exclude it from the area difficult. By simply measuring the distance between the tree and the measuring point, the Vertex IV can calculate the minimum diameter the tree should have in order to be included in the counting.

Data can be sent through IR or Bluetooth and results can be stored and processed in for example the Digitech Professional/DP II computer caliper, other PC or handheld computer.

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HAGLÖF SWEDEN®

Haglöf Sweden® AB is a family owned company with long time experience of developing and manufacturing professional inventory and cruising products. Our solid knowledge in engineering mechanics has increased and includes production of high technology electronics and specialized software development. Today Haglöf Sweden offers the most complete assortment of products for forest inventory and cruising, all developed and manufactured in Sweden. Our portfolio includes increment borers, manual and computerized calipers, Walktax and complete measurement systems including both instruments and software.

More accessories and new solutions, often user specified, are continuously developed. Please contact us and visit us at www.haglofsweden.com for more information and news.

Haglöf Sweden instruments are used in professional forestry work, and also in building, planning and construction. Additional user areas are within the police and army forces, in research, archeology, geology, geography, power line control, fish measurement, and health industry.

Over 200 companies around the world represent Haglöf Sweden products and offers quick and skilled service to customers on a global level. Do not hesitate to contact us if for questions and comments on your instruments and thank you for using a Haglöf Sweden product!



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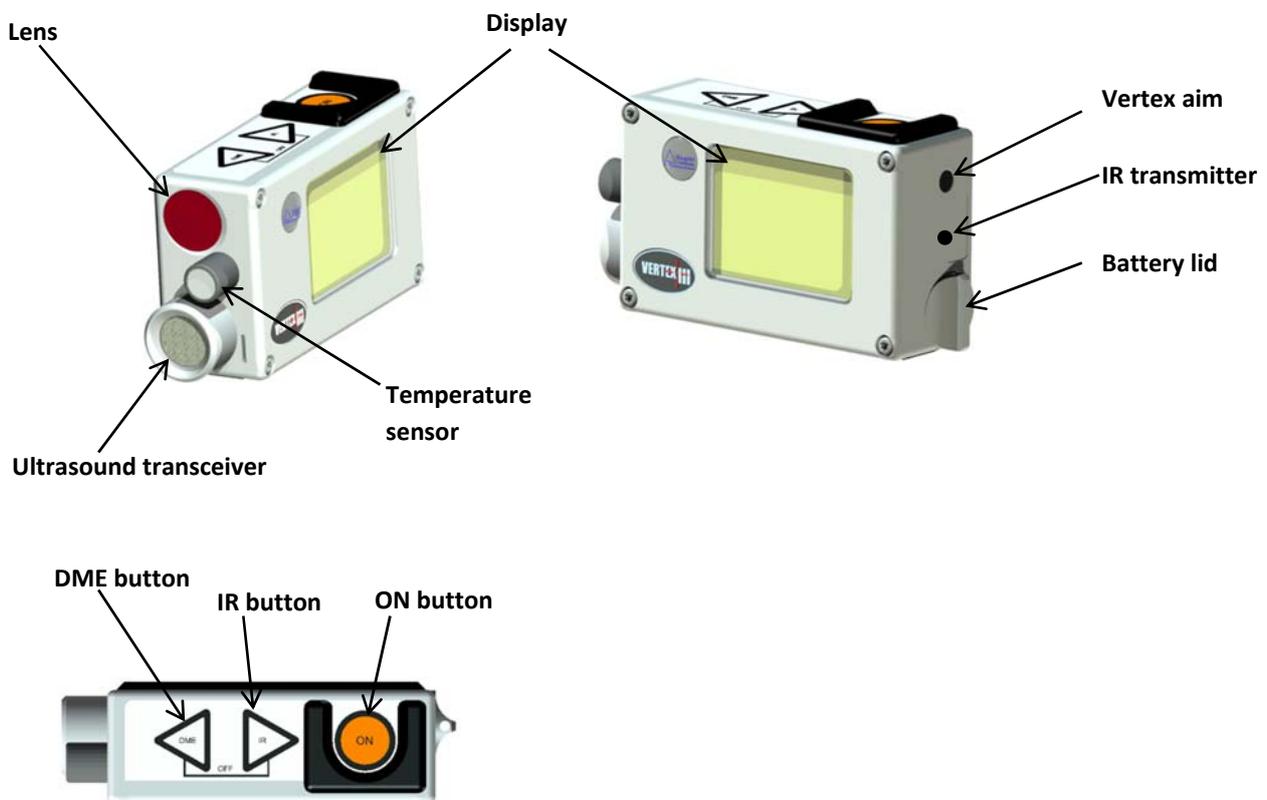
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VERTEX IV

Vertex IV is a high quality measurement instrument for the professional user that needs reliable and accurate distance-, angle and height results. With a number of unique features, the Vertex IV is one of the best field adapted instrument systems for use in tree height measurement applications.

DESCRIPTION



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INFORMATION

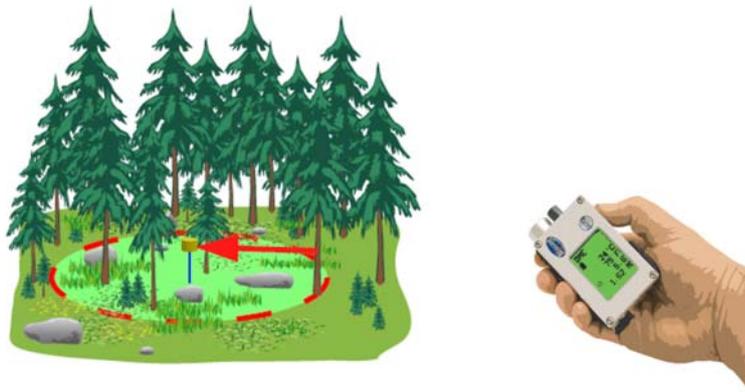
The Vertex IV system is based on ultrasound technology and advanced electronic angle measurement. The instrument is built in a compact, sealed and rugged instrument house. The ultrasound method is especially well adapted to measure distances in sample plots in dense forests.

The Vertex IV uses ultrasound to measure the distance, and a high quality tilt sensor to measure angles. **The ultrasound technique allows for high precision measurements on short distances. Ultrasound works in dense forests and where the visibility of the measuring objects is completely or partially obscured.** The ultrasonic signals are emitted from the Vertex IV instrument to the transponder T3, and the distance in between these units is presented in the instrument display.

Object heights are calculated with the measured variables from the distance and the angle. The T3 is used as transponder for the ultrasound and as a point of reference. The T3 transponder works both for 60° aimed, or directed measuring, for example when pinned to a tree stem, and in a 360° circle when installed on the adapter and monopod plot staff, especially designed for circular sample plot work. Together with the results for angle, the horizontal distance to the reference point are calculated with the Vertex IV.

The Vertex IV has a built in function to determine if border trees are to be included or not when measuring with a factor gauge. To use, measure the diameter of the tree, and then the distance from the tree to the measuring point. The Vertex IV will display the results on if including or not the particular tree in the plot. Optional Basal Area Factors when **metric** is setup: 0,5, 1, 2, 3, 4, 5, 6, 7, 8, 9. Basal Area Factor (BAF) when **feet** is setup: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50.

Vertex IV has built in IR and Bluetooth® to send the data to the Digitech Professional/DP II computer calipers, to other handheld computers or to your PC.



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QUICK GUIDE

TURN ON/OFF T3 TRANSPONDER

ON

Hold the Vertex IV loudspeaker approx. 2 cm/1 in. from the T3 transponder. Press the DME button. 2 short beeps are heard from the transponder and it is ON.

OFF

Hold the Vertex IV loudspeaker approx. 2 cm/1 in. from the T3 transponder. Press the DME button. 4 short beeps are heard from the transponder and it is OFF.

HEIGHT MEASUREMENT WHEN USING THE T3 TRANSPONDER

Start the transponder and place it on the object to measure. Press ON. Aim towards the transponder positioned at the preset T.HEIGHT. Press ON until the Vertex sight-cross goes out. Release the ON-button. The Vertex sight-cross starts to blink. Aim to the height to measure. Press ON until the Vertex cross goes out. The measured height is displayed. Repeat the procedure to measure more heights on the same object.

HEIGHT MEASURING WITHOUT USING THE T3 TRANSPONDER

Press ON. HEIGHT is displayed. Press ON and M.DIST is displayed. Change M.DIST in SETUP (or use the current value if accurate) and press ON. Aim to the point that corresponds to the preset T.HEIGHT. Press ON until the Vertex sight-cross goes out. Release the ON button and the Vertex sight-cross starts to blink. Aim to the height to measure. Press ON until the Vertex sight-cross goes out. The measured height is displayed. Repeat the procedure to measure another height.

HEIGHT MEASURING HORIZONTALLY

Press ON. HEIGHT is displayed. Press ON and M.DIST is displayed. Change M.DIST in SETUP or use the current value if accurate. The angle is now displayed. Press IR and ON simultaneously to reset the angle. The height measuring position is featured. Aim to the height to measure and press ON until the Vertex sight-cross goes out. The measured height is then displayed. Repeat the procedure to measure more heights on the same object. Note that the preset T.HEIGHT is included in the measured height value. T.HEIGHT is often set at operator's eye height.

ANGLE MEASURING

Start the Vertex with ON. Use the arrow keys to go to ANGLE. Press ON. Aim to the point where to measure the angle. Press ON until the Vertex sight-cross goes out. The measured angle is displayed. The result is displayed in degrees (DEG), grads (GRAD) and percent (%).

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HORISONTAL DISTANCE IN SLOPES

Press ON to start the Vertex IV. Use the arrow keys to go to ANGLE. Press ON. Aim to the angle to measure. Press ON until the Vertex sight-cross goes out.

Press the DME button when the angle has been measured. The horizontal distance is displayed. Horizontal distance measurements are useful if a circular sample plot is located in a slope.

DISTANCE MEASURING (DME)

Activate the T3 transponder and place it on/by the object where the required distance to be measured. Press the DME button. The measured distance is displayed in meters or feet. Metric or feet is set in the SETUP menu.

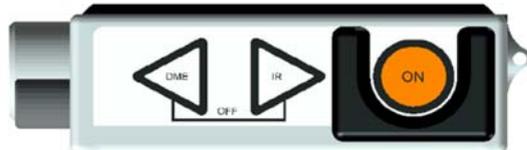
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KEYPAD

The keypad is easy to operate to step through the different menus. The Vertex IV instrument uses two arrow buttons (DME and IR) and one ON button.



ON

The ON button is used to start the Vertex IV, to confirm a value and as a trigger when measuring heights and angles. ON is also used when choosing between menus and/or functions.

ARROW BUTTONS

The two arrow buttons are marked "DME" and "IR" and used to navigate menus, change values and options.

DME

When the Vertex IV is OFF, distance measurement can be activated with a short press on the DME button. When measuring heights, the brightness of the Vertex sight-cross can be changed with the DME-button.

IR

Send data while measuring with IR or Bluetooth® with the IR-button.

OFF (DME + IR)

Simultaneously press the DME and IR-buttons to abort a function or turn the Vertex IV OFF. The Vertex IV automatically turns itself off after 60 sec's of inactivity.

THE VERTEX SIGHT

The Vertex IV has a high intensive, red Vertex sight-cross. The sight has no magnification which facilitates identification of nearby objects. The intensity of the Vertex sight-cross light can be adjusted while measuring, and by pressing the DME-button. There are 7 different intensity modes.



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SETUP – SETTINGS

In the SETUP MENU, settings are made to measure heights, distances and angles.

1. Press **ON** to activate the instrument.
2. Choose **SETUP** and press **ON** to confirm this option.
3. Use **DME** and **IR** to change values and options. Press **ON** to confirm your choice and the next option will appear. The settings will be saved when all steps are made. Abort by pressing **DME** and **IR** simultaneously.

METRIC/FEET:

Choose if height and distance values are to be featured in **METRIC** or **FEET**. Shift with the arrow keys and confirm your choice with **ON**.

DEG/GRAD/%:

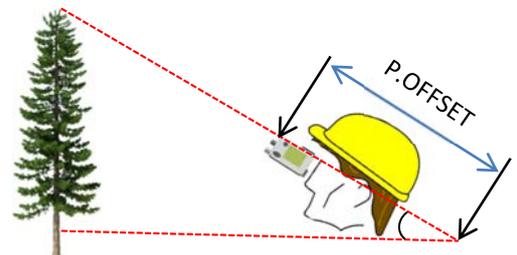
Choose angle unit in DEG (degrees 0...360), GRAD (grads 0...400) or % (percent) by pressing the arrow keys. Confirm by pressing **ON**.

P.OFFSET:

The Pivot Offset is equal to the distance between the front side of the Vertex IV to the aimed point where the prolonging of the sight line from the transponder and the top of the tree coincide.

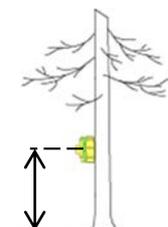
The imagined point is located somewhere behind your neck and the value is normally set to 0,3 m (1.0 feet)

Since the Vertex IV will presume that the transponder T3 is placed vertically under the aimed height of the measurement object (when the object is equal to a tree), a half of the object's diameter should be added to the Pivot Offset. This compensates for the tapering of the tree. When measuring tree heights, it is recommended to add half the average diameter in the area, for improved accuracy.



T.HEIGHT:

The transponder height or other reference height shall conform with the distance from the ground to the reference point. The value is set in metric/feet. **T.HEIGHT** typically refers to the centre of the T3 transponder or zero (0) if the reference point is the ground or the lowest part of the object to measure. The Vertex IV adds the preset **T.HEIGHT** to the measured height. The normal value for breast height is 1,3 m (4,5 ft.).



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M.DIST:

The M.DIST function is useful when measuring without transponder. Change value with the arrow keys and confirm with ON. The value is shown in metric/feet. M.DIST is the manual distance from the front of the Vertex IV to the reference point on the object where the first angle is measured. Make sure that the T.HEIGHT is correctly set, i.e. the height to the chosen reference point.

! NOTE! The accuracy of the manual distance affects the accuracy of the height result.

BAF:

When working with Factor Gauge or Prism some trees cover others and this can cause problems. A frequent problem is to determine if to include or exclude border trees in the plot.

With the Vertex IV built in BAF function, the minimum tree diameter for trees to be included can be featured. By measuring the distance from the tree to the measurement point with the Vertex IV, the instrument can calculate the minimum diameter for a tree to be included.

These BAF factors are available in the Vertex IV:

0.5, 1, 2, 3, 4, 5, 6, 7, 8, 9 (m²/ha)

or

5, 10, 15, 20, 25, 30, 35, 40, 45, 50 (ft²/acre)

The Vertex IV can compensate for the minimum diameter even if the terrain is inclined.

CONTRAST – SETTING THE DISPLAY CONTRAST

1. Press ON to activate the instrument.
2. Choose CONTRAST and press ON to confirm this choice.
3. Use DME and IR to change the contrast of the display, 47 different modes are available. (*Min 80 and Max 127. Default is 100*).
4. Press ON to confirm or press DME and IR simultaneously to abort the function and leave the menu.

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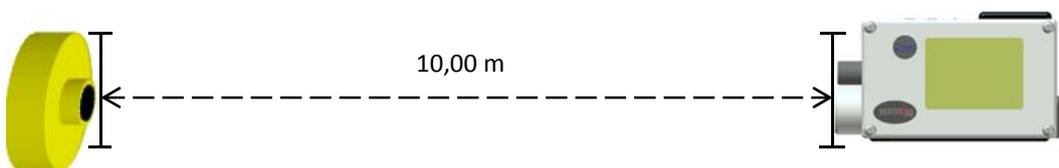
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CALIBRATE – CALIBRATING THE ULTRASOUND

To obtain maximum accuracy the Vertex IV should be calibrated.

1. Make sure that the Vertex IV has the same temperature as the surrounding air.
2. Use a measuring tape to measure the exact distance of 10,0m/32.8 feet.
3. Place the transponder at the end of the measured distance.
4. Make sure the Vertex IV is OFF.
5. Activate the T3 transponder by holding it within approx. (2 cm/ 1 inch) from the ultrasound speaker in the front of the Vertex IV and press DME. Await two (2) short beeps from the transponder. The T3 transponder is now active and will stay in that mode until it automatically turns itself off after 20 minutes of inactivity. To turn the transponder off, actively repeat the procedure above and await four (4) short beeps.
6. Press DME and IR simultaneously to turn the Vertex IV off.
7. Place the Vertex IV (front towards the transponder) exactly 10 m/32.8 feet from the front side of the transponder.
8. Press ON to activate the instrument.
9. Choose CALIBRATE and press ON to confirm this choice.
10. When the digits 10.00 are shown in the display the calibration of the Vertex IV is done.
11. Simultaneously press DME and IR to leave this menu.
12. See www.haglofsweden.com for a filmed step-through sequence featuring the calibration process



! It is important that the temperature sensor in Vertex IV has been given enough time to adapt to the ambient temperature. If the Vertex IV is carried in an inner pocket, it will take more than 10 minutes for the instrument to adapt. Example: The Vertex IV is carried in an inner pocket with a temperature of +15°C. The ambient temperature is -5°C. The measurement result will instead show 10,40 m instead of the correct 10,00m. the temperature dependent error at 10,00m is approx. 2 cm/°C. If the calibration is made before that the temperature sensor has stabilized, the error will be permanent. A correct result can be displayed for a short time, only to become incorrect soon after.

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BATTERY

The Vertex IV uses an alkaline or rechargeable 1,5 V AA battery, that is placed under the battery lid with the + pole inwards.

A battery symbol in the display shows battery status with 4 icons (100%, 75%,50%, 0%). Under normal conditions the battery will last for weeks or even months. Frequent use of the Bluetooth function will reduce the battery capacity.



TO MEASURE DISTANCES

ULTRASOUND

Ultrasonic signals are used to perform measurement operations in the forest, in dense terrain and circular sample plots.

SOME FACTS ABOUT ULTRASOUND

Ultrasound pulses travel with different speed depending on external circumstances. In open terrain and without obstacles between the Vertex IV instrument and the transponder, distances up to 40 meters and more can be measured. With the transponder set to measure in a full circle, the distance will be approx. 20 meters. Always calibrate the ultrasound in the current temperature and make sure that the Vertex IV has the same temperature as the ambient air. A built in sensor compensates for temperature variations. To obtain maximum precision it is recommended to control and if necessary calibrate the instrument periodically, preferably daily.

DME –DISTANCE MEASURING WITH ULTRASOUND

1. Turn the Vertex IV OFF.
2. Activate the T3 transponder by holding it within approx. (2 cm/ 1 inch) from the ultrasound speaker in the Vertex IV front and press DME. Wait for 2 short beeps from the transponder. The T3 transponder is now active and will stay in active mode until it turns itself off after 20 minutes of inactivity. To turn the transponder off, repeat the procedure above mentioned and wait for 4 short beeps.
3. To measure a distance, press the DME button and the measured distance is displayed.
4. Repeat point 3 in order to measure more distances.

Press DME and IR simultaneously to turn the Vertex IV off.

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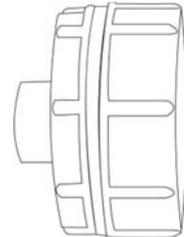
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TRANSPONDER T3

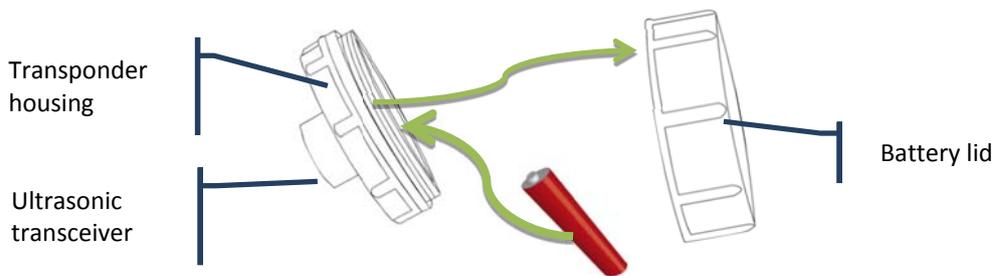
The Vertex IV system includes a T3 transponder (normal configuration).

The transponder has an ultrasonic transceiver that communicates with the Vertex IV instrument. The transponder can be used for direct measurements and to measure in a full 360° circle, suitable when working in circular sample plots. A monopod plot staff and adapter/spreader are used to place the transponder in the centre of the sample plot. For directed measurements the transponder is pinned to the tree with a small metal hook on the backside of the transponder.

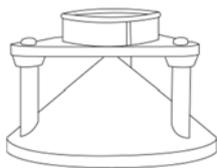


The T3 transponder emits a signal that indicates if the transponder is ON or OFF. The transponder has no switch and the Vertex IV instrument is used as remote control. The transponder will automatically turn itself off after approx. 20 minutes of inactivity.

The Transponder T3 uses a 1,5 AA alkaline battery, placed under the battery lid.

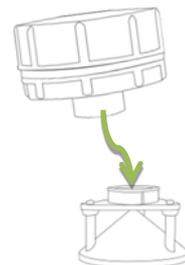


ADAPTER/SPREADER



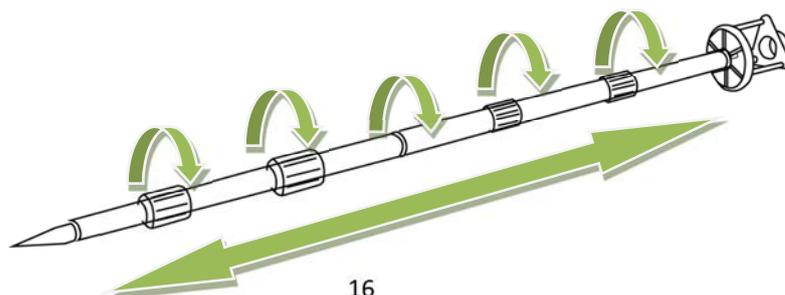
The adapter/spreader and a custom plot staff is included in a Vertex IV-360 configuration.

The adapter enables measurements in a full 360° circle, and is suitable to use in sample plot cruising work.



PLOT STAFF - MONOPOD

The plot staff is used with the adapter for the transponder T3. The staff is telescopic, lightweight and height adjustable.



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BAF –BASAL AREA FUNCTION

When you measure with a factor gauge or a prism, some trees can be obscured by other trees, hence preventing a correct basal area measurement. With the Vertex IV built in BAF-function the minimum diameter for each tree is displayed when the distance from the plot center is measured with ultrasound. Start by setting the factor (BAF) that the factor gauge or prism has in the SETUP menu, see section SETUP. Measure the distance from the tree to the reference point with the DME function. The distance and a calculated minimum diameter (cm/inch) are displayed. The diameter of the tree is measured and should only be included/counted in the plot only if the diameter exceeds the diameter shown in the Vertex IV display.

Selectable Basal Area Factors if metric: 0,5, 1, 2, 3, 4, 5, 6, 7, 8, 9. (m²/ha)

Selectable Basal Area Factors (BAF) if feet: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50. (ft²/acre)

If the terrain is inclining, the Vertex IV can compensate the minimum diameter, depending on the inclination. Use the ANGLE function to measure both distance and angle from the tree to the plot center, see section ANGLE-horizontal distance with ultrasound.

HEIGHT MEASURING WITH VERTEX IV

The Vertex IV is an excellent instrument to measure heights, and especially tree heights.

HEIGHT – TWO POINT MEASURING WITH ULTRASOUND

Vertex IV provides different modes to measure heights. The current situation and surrounding can determine which mode is most suitable.

1. Make sure the T3 transponder is ON and placed at the right height (T.HEIGHT in the SETUP MENU).
2. Press ON to activate the instrument.
3. Choose HEIGHT and press ON to confirm this choice.
4. Aim to the T3 transponder and press ON to measure distance and angle. Aim and press ON until a beep is heard and the Vertex sight-cross goes out. Release the ON button. The Vertex sight-cross starts to blink.
5. Aim at the top (or other height) at the object and press ON until the beep is heard and the Vertex sight-cross goes out.
6. The height (T.HEIGHT included) is now shown in the display.
7. Repeat point 5 to measure more heights.

Press DME and IR at the same time to leave menu.

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HEIGHT – TWO POINT MEASURING WITH MANUAL DISTANCE

1. Press ON to activate the instrument.
2. Choose HEIGHT and press ON quickly to confirm this option.
3. M.DIST is displayed. Press briefly ON to confirm the manual distance; or go to SETUP MENU and change M.DIST. M.DIST is the distance from the front of the Vertex IV to the reference point.
4. Aim to the reference point at known height, T.HEIGHT in the SETUP MENU, set to zero (0) if the reference point is equal to ground level. Press and hold the ON button to measure the angle to the reference point. Hold the ON button depressed until a short beep is heard and the Vertex sight-cross goes out. Release the ON button. The Vertex sight-cross should now be blinking.
5. Aim to the top (or other height) at the object and hold ON depressed until a short beep is heard and the Vertex sight-cross goes out.
6. The height (T. HEIGHT included) is now displayed.
7. Repeat point 5 to measure more heights.
8. Press DME and IR at the same time to step out of menu.

! Note that the accuracy in the manually registered distance will affect the result.

HEIGHT – ONE POINT MEASURING FROM THE HORIZONTAL LINE

Height measuring with fixed distance and zero reference angle is a useful function in some situations.

1. Press ON to activate the instrument.
2. Make sure that the right T.HEIGHT is set in the SETUP MENU.
3. Choose HEIGHT and press ON to confirm this choice.
4. Accept the distance shown in the display (M.DIST) with a quick press on the ON button. If the distance is incorrect, set in the SETUP MENU. With M.DIST the horizontal distance to the object is referred.
5. Press IR and ON simultaneously to reset the reference angle. Hold the buttons down until a long beep signal is heard.
6. Aim at the top (or other height) at the object and hold ON depressed until a beep is heard and the Vertex sight goes out. Release the ON button.
7. The Height (T.HEIGHT included) is now shown in the display.
8. Repeat point 6 to measure more heights.

Press DME and IR at the same time to step out of menu.

If both the user and the object to measure are at the same horizontal ground level, the operator eye height should be entered as T.HEIGHT in the SETUP MENU.

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ANGLE–ANGLE MEASURING

1. Press ON to activate the instrument.
2. Choose ANGLE and press ON to confirm this option.
3. Aim and hold ON depressed until a short beep is heard and the Vertex sight-cross goes out.
4. The angle to the object is shown in degrees (DEG), grads (GRAD) and percent (%) in the display.

Press DME and IR at the same time to step out of menu.

Note that the angle is measured with the Vertex sight. This implies that it is not possible to use the outside frames of the Vertex IV to measure an angle of, for example, a table surface.

DISTANCE MEASURING WITH T3 TRANSPONDER ON 360° ADAPTER/SPREADER

With the adapter, the ultrasonic signals are distributed allowing measurements from any direction in a full circle. This is especially useful when working in circular sample plots where the distance from the plot center to an object in a circular sample plot can be measured.

! Note that the ultrasound has to travel approx. 3cm/1 inch extra and the reading should be done at the cutting edge of the Vertex IV display if calibration has been done according to the manual.

ANGLE – HORIZONTAL DISTANCE WITH ULTRASOUND

1. Make sure the Vertex IV is OFF.
2. Start the T3 transponder by holding the ultrasound transceiver in the front of the Vertex IV close to the transponder center (approx. 2 cm/1 inch) and press DME. Wait for 2 short beeps from the transponder. The T3 transponder is now active. The T3 transponder turns itself off after approx. 20 minutes of inactivity. To actively turn the transponder OFF, repeat the procedure above and wait for 4 short beeps.
3. Press DME and IR at the same time to turn the Vertex IV off.
4. Press ON to activate the Vertex IV.
5. Choose ANGLE and press ON to confirm this option.
6. Aim and press ON until a short beep is heard and the Vertex sight-cross goes out.
7. Press DME to measure the distance. The Vertex sight-cross lights up again when the measurement is completed.
8. The Vertex IV presents the horizontal distance in the display.

Press DME and IR at the same time twice or ON twice to step out of menu.

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BAF FUNCTION –MINIMUM DIAMETER IN INCLINED TERRAIN

The Vertex IV can compensate the calculated minimum diameter in slopes/inclining terrain. Use the ANGLE function and measure the angle from the tree to the sample plot center. Activate the distance measuring function by pressing the DME button. Horizontal distance and the calculated minimum diameter are displayed.

BLUETOOTH – COMMUNICATION

Vertex IV instruments have built in Bluetooth®. This enables wireless transfer of data to a PC, computer calipers or handhelds. The setup is made with the instrument in “slave mode”. Certain computer devices will ask to activate a pin code before making the connection. The pin code should be activated in the Bluetooth menu. The Vertex IV uses default code **12345**. Use this code if pin code has been activated.

! The distance between the connected, receiving computer device and the Vertex IV should not be longer than 10m or 32 ft. This is the maximum distance to transfer data with Bluetooth®.

ACTIVATE BLUETOOTH®

1. Press ON to activate the instrument
2. Choose BLUETOOTH® and press ON to confirm this choice.
3. Activate CODE 12345 with ON (if PIN code is needed) if not choose -NONE- with DME or IR and press ON.
4. Activate Bluetooth® by choosing ON and press the ON button. It is now possible for external devices to connect with the Vertex IV.

Data is sent when you press the IR button on the Vertex IV when you have measured a height, angle or distance.

The Vertex IV will not disconnect the Bluetooth® connection even when the instrument is switched off. This means that that you can send data with Bluetooth® if turning on and off the Vertex IV without having to reactivate the Bluetooth® function.

To deactivate Bluetooth®, change 'ON' to '--' in the BLUETOOTH® menu. When the Bluetooth® function is activated the Bluetooth® symbol is shown in the display as a reminder that the function is active. The Vertex IV will turn the connection down after approx. 20 minutes of inactivity.

! Note that the Vertex IV consumes more battery when the Bluetooth® function is activated. Do not forget to turn the function off when not in use, for example when moving between sample plots. To turn the Bluetooth® function off, simply change the 'ON' to '--' in the Bluetooth® menu.

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BLUETOOTH-PORTS IN COMMON COMPUTER DEVICES

The documentation on available ports for different computer devices and Bluetooth® is often limited and you may have to experiment to establish connection.

These are the ports in some common handheld computer brands:

ALLEGRO

COM6 is usually the internal Bluetooth® port.

RECON

COM4 is usually the internal Bluetooth® port.

SIGN FORMAT BLUETOOTH

The transfer rate (baud rate) and numbers of stop bits is determined automatically by the receiver. The number of bits per sign is 8 data bits and no parity.

IR – COMMUNICATION

Data can be sent by IR (Infrared light) to Digitech Professional/DP II Computer Caliper or to a special IR-receiver, which can be installed in a serial port (RS232).

1. Aim with the instrument IR-eye to the IR-receiver and press the IR button.

The distance between the Vertex IV and the IR-receiver should not exceed 10cm/4 inches for a successful transfer.

SIGN FORMAT IR

Data can be sent from all measuring functions within the Vertex IV. If necessary use settings baud 1200bps, 7 data bits, 1 stop bit and even parity.

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DATA FORMAT

Data from Vertex IV is sent serial as text.

HAGLOF

The data packet contains a total of 40 signs.

```
1 0000<LF><CR>
2 0000<LF><CR>
3 0000<LF><CR>
4 0000<LF><CR>
5 +000<LF><CR> (negative angle replaces '+' to '-')
<LF>=Linefeed (ASCII 10)
<CR>=Carriage Return (ASCII 13)
```

When height measuring, the following is sent.

```
Row 1:      1st height (dm alt. feet X 10)
Row 2:      2nd height (dm alt. feet X 10)
Row 3:      3rd height (dm alt. feet X 10)
Row 4:      horizontal distance to the object (dm x 10 alt. ft X10)
Row 5:      angle to the object (grads X10)
```

When distance measuring, the following is sent.

```
Row 1:      0000
Row 2:      0000
Row 3:      0000
Row 4:      distance to transponder (cm alt feet X 10)
Row 5:      angle to the object (grads X10)
```

*If the angle (row 5) has a larger or smaller value than zero (0) the distance is the calculated horizontal distance.

EXAMPLE OF CONNECTION TO PC

- Start the Vertex IV by pressing ON.
- Select the BLUETOOTH menu with the arrow keys. Press the ON button
- Select to use Pin code by pressing any of the arrow keys. The code 12345 should be shown in the display. Press the ON button.
- Activate Bluetooth by pressing any of the arrow keys. ON should be shown in the display. Press the ON button.
- Activate the Bluetooth settings in your PC.
- Select to add a new device.
- The PC is searching for new devices. Choose 'VertexIV xxxxx' in the list of available Bluetooth units.
- Note the COM-port number given to the Vertex IV. This is the port that should be used.
- Start a communication program, e.g. HyperTerminal in Windows (see accessories in Windows). Start a new session and select to open the port that you have noted above.
- Measure a height or a distance. Send data by pressing the IR button.

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TECHNICAL SPECIFICATION

Size (L x B x H)	80x50x30mm (3,15"x1,97"x1,18")
Weight	180 g (6.35 oz.)(incl. battery)
Housing and frame	Aluminum
Battery	1x1.5 V AA alkaline.
Temperature	-20° to +45°C / -4°F to 113°F
Ultrasonic frequency	25 kHz
Height	0-999 m (0-999 ft.)
Resolution height	0.1 m (0.33 ft.)
Angles	-55° to +85° deg./ -60° to +94° grads.
Resolution angle	0,1° deg.
Units angle	Degrees 360°, Grads 400°and percent %
Distance with directed T3 transponder	30 m or better in good conditions.
Distance with 360° adapter/spreader	20 m or better in good conditions.
Resolution distance	0,01 m/0.39 inch.
Accuracy distance	1% or better if calibrated.
Bluetooth®	Yes

T3 TRANSPONDER

Size	Diameter 70 mm (2.76 inch)
Weight	85 g/3oz (incl. battery)
Battery	1,5V AA alkaline
Consumption:	10,0 mA

USER INTERFACE

Buttons	Three (3) multifunctional buttons
Display	Graphic LCD 100x60pixels
Bluetooth®	Class 2, Spp (serial profile), pin code 12345
IR	Haglöf Standard format
Sight	LED-cross hair 1x magnification

OTHER INFORMATION

Adapter/Spreader	Plastic, weight approx.30g/1oz
Monopod/Plot staff	two-part, adjustable33-140cm/13"-55,1"., weight approx. 270g/9.5oz, aluminum/plastic
Case	Aluminum case for transport and storing

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FAULT DETECTION

Problem	Cause
No distance shown in the display.	<ul style="list-style-type: none">• Check that the transponder is activated.• Bad battery.• Disturbing noises in the surroundings.• Use of wrong transponder type.
Measured distance unstable.	<ul style="list-style-type: none">• Disturbing noises in the surroundings.• Vertex IV is poorly calibrated.
The Vertex sight will not go out	<ul style="list-style-type: none">• Check that the transponder is activated.• Bad battery.• Disturbing noises in the surroundings.• Use of wrong transponder type.• Angle to the object too wide, increase the distance to the object.
Vertex IV will not start	<ul style="list-style-type: none">• Bad battery.• Battery placed wrong way
T3 transponder will not start	<ul style="list-style-type: none">• Bad battery.
No measuring values are presented	<ul style="list-style-type: none">• Check that the transponder is activated.• Bad battery.• Disturbing noises in the surroundings.• Use of wrong transponder type.• Angle to the object too wide, increase the distance to the object.• The Vertex IV is not held steady enough.• The Vertex IV has not measured the horizontal distance.
Unrealistic or incorrect measuring results	<ul style="list-style-type: none">• Disturbing noises in the surroundings.

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Declaration of conformity

according to

EMC Directive 2004/108/EC and Low Voltage Directive 2006/95/EC

Type of equipment

Ultrasound Hypsometer

Brand name or trade mark

Vertex IV

Type designation(s)/Model no(s)

Manufacturer's name, address, telephone & fax no

Haglöf Sweden AB

Adress Klockargatan 8, 88230 Långsele, Sweden

Tel: +46-(0) 620-25580, Fax: +46-(0) 620-20581

The following standards and/or technical specifications, which comply with good engineering practice in safety matters in force within the EEA, have been applied:

Test report/ technical construction file/ normative document

Ref. No: 13094 / Issued by: Dectron AB

Standards

EMC Emission EN 61000-6-3:2007

EMC Immunity EN 61000-6-2:2005, EN 61000-4-2, -3

Additional information

The product is CE-marked in 2013

As manufacturer/ the manufacturer's authorized representative established within EEA, we declare under our sole responsibility that the equipment follows the provisions of the Directives stated above.

Date and place of issue

Ort, datum

Långsele 2013-10-03

Sweden

Signature of authorized person

Name & Position

Joakim Nygren

R&D manager

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WARRANTY AND SERVICE INFORMATION

Haglöf Sweden AB warrants that this product shall be free from defects in materials and workmanship, under normal intended use, for a period of 12 months after date of shipment. The warranty excludes the batteries, the accessories and any written materials. The warranty does not apply if the product has been improperly installed, improperly calibrated or operated in a manner not in accordance with the user's guide. Warranty is also automatically expired if the product has been opposed to external force and warranty is not applicable for cosmetic defects. The one-year limited warranty time covers obvious fabrication defects. Defects in the electronic components that are impossible for the manufacturer to detect prior to assembling and shipping of the product may occur. Haglöf Sweden AB can in no case be responsible for problems of this nature and has no liability for any loss of business, profits, savings, consequential damages or other damages resulting from use of the products described. Signs of misuse, cosmetic damage, accidents or equal automatically withdraw the warranty. The warranty is valid in the country where your Haglöf product has been purchased. A product covered by warranty will be object to exchange, service, and repair or according to special agreement between seller and buyer, within the frames of the limited warranty. Haglöf Sweden reserves the right to determine which option will be most suitable for each separate case after having examined and evaluated the product.

IMPORTANT ISSUES

- Always turn to your Haglöf Sweden distributor/representative/place where your instrument was purchased for first-hand assistance with service and support!
- For a valid warranty, a copy of invoice or dated receipt of your purchase must be presented. The serial number of the returned product has to be clearly stated upon return. At <http://www.haglofsg.com> an RMA return form can be downloaded by your Haglöf Sweden supplier.
- The return freight to us is on buyer's expense. After warranty repair or exchange, the return freight to you is on our expense. If warranty has expired or is null and void, all freights are on buyer's expense.
- If no original invoice can be presented upon shipment, or if two years or more have passed from date of purchase, a customs fee will be added by the applicable customs authorities and possibly in receiving country as well. These fees are on buyers account.
- We perform repair and service of products where warranty has expired when possible. Cost estimation will be sent to you after evaluating the returned product for cost approval. Please also see above paragraph on customs fees.
- Please do not hesitate to contact us or any Haglöf Sweden AB representative for questions or comments!

Any signs of misuse or negligence automatically withdraw our warranty commitments

SAFETY AND OPERATION PRECAUTIONS

To avoid injury or material loss, please read this safety and operation precautions thoroughly:

- Never aim directly at the sun when using the Vertex IV instrument.
- Do not use the Vertex IV instrument together with other optical instruments, such as binoculars and lenses. Using an optical instrument together with the Vertex IV increases the danger of eye damage.
- Do not disassemble the Vertex IV instrument. Any signs of disassembling automatically withdraw any warranties and the manufacturer does not guarantee the product.
- If the Vertex IV instrument body cover is damaged, or if the instrument emits a strange sound due to dropping, remove the battery and stop using immediately.
- Never place the Vertex IV in an unstable place.
- Never look through the Vertex IV instrument while walking.
- If you should develop any symptoms of eye irritation or skin inflammation around the eye, consult a doctor immediately.
- If the Vertex IV instrument should fail to operate correctly, discontinue use and consult the manual. If you are unable to fix the problem, contact your local dealer for instructions or where to send the instrument for repair.

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CARE, STORAGE AND MAINTENANCE

- Store the Vertex IV in its case when not used. Do not swing the instrument by its strap.
- Although the Vertex IV instrument is water and dust resistant, it should not be used in water and it is not waterproof.
- Use a soft, clean and dry cloth to clean the Vertex IV instrument if exposed to rain, water, sand and mud. Do not use alcohol, benzene, thinner or other organic agents to clean the instrument's main body. Always clean as soon as possible after the exposure, and always store the instrument in a dry, cool place and away from direct sunlight.
- Use a soft oil-free brush to remove dust from the lens surface. To remove stains or smudges (fingerprints etc.), wipe lenses gently with a soft clean cotton cloth or oil-free lens tissue. Stubborn smudges can be removed with a small amount of pure alcohol using extra care to avoid scratching of the lens surface. The tissue should only be used one time.
- Do not expose the instrument to excessive heat or ultraviolet rays, since this may negatively affect or damage the unit.
- Avoid pushing the ON button when not using the Vertex IV instrument.
- When exposed to sudden changes in temperature or high humidity, water condensation may appear on lens surfaces. Do not use the Vertex IV instrument until this condensation has evaporated. Dry the instrument at room temperature and store in a cool, dry place.
- Keep the instrument and any parts of and for the instrument out of reach of small children. Consult a doctor immediately if a small child has swallowed any parts of the instrument or its packing.

BATTERY INFORMATION

- Both the Vertex IV and the transponder T3 use alkaline batteries. Exchange when needed and recycle the old battery.
- Batteries are sensitive for impacts and moisture.
- If eyes or skin are exposed to a leaking battery, rinse with large amounts of water, consult a doctor if the battery has been swallowed
- Do not short-circuit battery chamber terminals, and do not carry batteries with keys or coins in a pocket. This may short-circuit the batteries.
- Keep away from fire and water and do not disassemble batteries.
- Avoid strong vibrations, shock or extremes in temperatures for stored batteries.
- If handled incorrectly, batteries may rupture and leak, corroding equipment and staining clothing
- Do not throw batteries in regular trash bins. Always dispose of batteries in designated containers for recycling and following the manufacturer's recommendations.

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