

Components

The DME distance measurer contains the following components (Figure 1);

1. Distance measuring unit
2. Transponder
3. 360 degree cone
4. Plot center staff

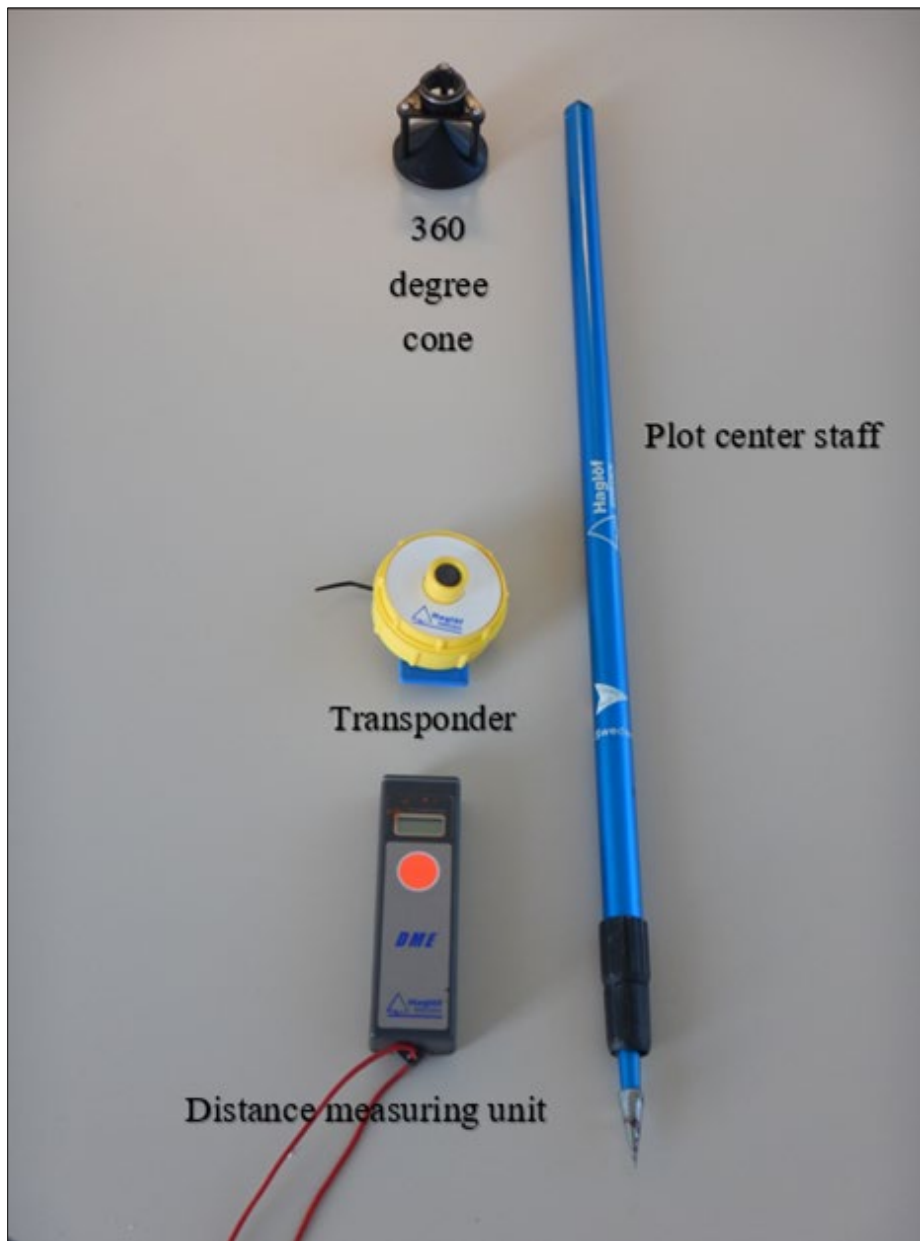


Figure 1. The components of the distance measuring device.

Functions

The DME distance measuring device uses ultrasonic impulses to determine a distance. The speed these signals travel in the air depends on several factors such as air humidity, air pressure and, most of all, air temperature. The DME has a built-in temperature sensor that automatically compensates to give the correct distance even if temperature changes. To obtain optimal accuracy, the instrument must be checked and calibrated if necessary.

Cover both the distance measuring unit and the transponder with a plastic bag if it starts to rain. If rain persists, then turn off the instruments and pack them away. The instruments will not work properly in the rain or when humidity is very high (90–100%). After fieldwork, store the instruments in a cool, dry storage area and always remove the batteries to keep battery corrosion from ruining the instruments.

Table 1. Function displays on the distance measuring unit.

Number	Function	Other Display	Description
[F1]	Distance measuring	[---]	The DME working
[F3]	Measuring unit reset to transponder function. For measuring with two measuring units.	[trP]	Measuring unit set as transponder.
[F5]	Change unit. Meter or feet.	—	—
[F6]	No function. Space reserved	—	—
[F7]	Temperature	—	—
[F8]	No function. Space reserved	—	—
[F9]	Calibration	—	—

Transponder

The transponder is an ultrasonic transmitter and receiver that corresponds with the distance measuring unit. It can be used for measuring both in a point-to-point fashion and 360° circle when used with the 360° cone. The transponder has been equipped with an audible sound signal. The signal is used to determine if the transponder is activated. The transponder uses only one AA battery placed under the lid (Figure 2).

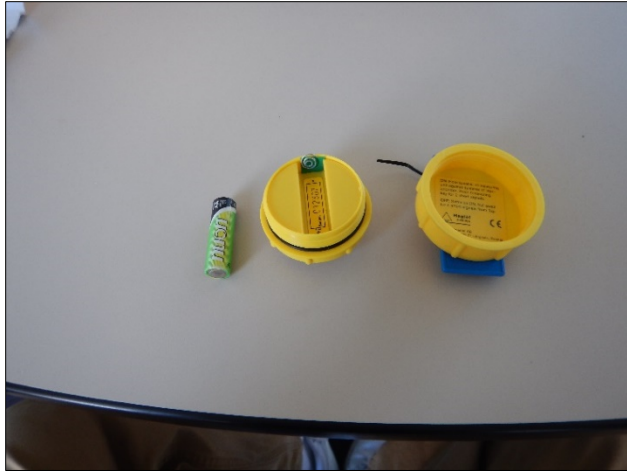


Figure 2. The transponder takes one AA battery placed under the lid.

To measure in a 360° circle, it is necessary to use the cone. The ultrasonic signal is spread and will return in a circle. The cone can easily be assembled on the plot center staff. The transponder is attached in the hole of the cone (Figure 3).



Figure 3. To measure trees within a 360° circle, the transponder is attached to the 360° cone which itself is fastened to the top of the plot center staff.

Turning the transponder on

To turn the transponder on, hold the end of the distance measuring unit with the loudspeaker (the top end of the distance measuring unit with the circular felt speaker) one to two centimeters from the transponder (Figure 4). Press the orange colored button of the distance measuring unit until two short beep signals are heard from the transponder.

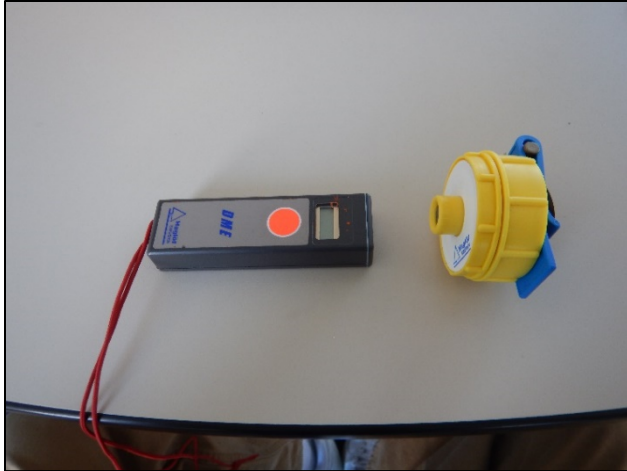


Figure 4. To turn the transponder on and off, hold the end of the distance measuring unit one to two centimeters from the transponder and press the orange button.

Turning the transponder off

To turn off the transponder, hold the distance measuring unit one to two centimeters from the transponder (Figure 4). Press the orange colored button of the distance measuring unit until four short beeps are heard.

Calibration

When calibrating the distance measuring unit, it is of the utmost importance that the instrument is given enough time to adjust to the current temperature of the measuring area (function F7 will display the current temperature of the measuring unit). If the instrument is carried in a pocket, this can take up to 10 minutes. The temperature error is approximately 2 centimeters (0.8 inches [in]) per degree Celsius. For example, if the temperature inside the pocket is 15° C and the air temperature is - 5°C, the measuring result will be 10.4 meters (34.1 feet [ft]) when the true reading is 10.0 meters (32.8 ft). Best accuracy is obtained after 10 minutes of adjustment. If the instrument is calibrated at the wrong temperature, the measuring inaccuracy will persist until it is recalibrated. To calibrate the distance measuring unit:

1. Measure a distance of 10 meters (32.8 ft) between the transponder and the front of the distance measuring unit. In order for the instrument to approve calibration, the distance from the transponder to the front of the distance measuring unit must be between 9.6 and 10.4 meters (31.5 and 34.1 ft).
2. Look in the display of the distance measuring unit and rapidly press the orange button until function F9 is shown. The display should now show 10 meters (32.8 ft) and the calibration is accomplished. The calibration will only be approved by the instrument when the distance at calibration is within a certain interval (9.6-10.4 meters [31.5 and 34.1 ft]).

Distance Measuring

The distance measuring device is designed for outdoor use. The most sensitive parts of the instruments are the ultrasonic transmitters. Never leave the transponder upside down in rain or snow, since this may cause water to reach the openings for the ultrasonic transmitters. If this has occurred, let the transponder dry.

When changing the battery in the transponder (one AA battery), apply some Vaseline to the O-ring sealing on the lock (Figure 2). The transponder battery must be replaced when normal resolution is not reached (when the distance measuring unit displays four lines [- - -]). The distance measuring unit will take a 9-Volt battery inserted into the battery casing at the bottom of the unit (Figure 5).



Figure 5. The distance-measuring unit will take a 9V battery inserted into the battery casing at the bottom of the unit.

When measuring distance in the field, start and place the transponder at the tree plot center marker. Turn the transponder off when not in use. To obtain a correct distance, direct the distance measuring unit toward the transponder and press the orange button one time. Four lines [- - -] will show in the distance measuring units' display window. After a few seconds the distance will appear in the display window. Tree distances are determined by holding the distance measuring unit at the middle of the measured tree.

If the distance measuring unit does not obtain any answering signals from the transponder, the four [- - -] in the display window will appear and no distance will be displayed. In this case, check if the transponder is set, that batteries are working or if other errors may have occurred. If the orange button is kept pressed down, and the measurer slowly moves backwards, the instrument will measure the increased (or decreased if moving forward) distance continuously.

The specifications on the device indicate that when calibrated correctly the ultrasound with the 360 adapter range is approximately 20 meters (65.6 ft) and the resolution is 0.01 meter (0.03 ft) with an accuracy of 1% or better (at 7.54 meter $\pm$ 0.08 meter [24.74 ft $\pm$ 0.26 ft]).