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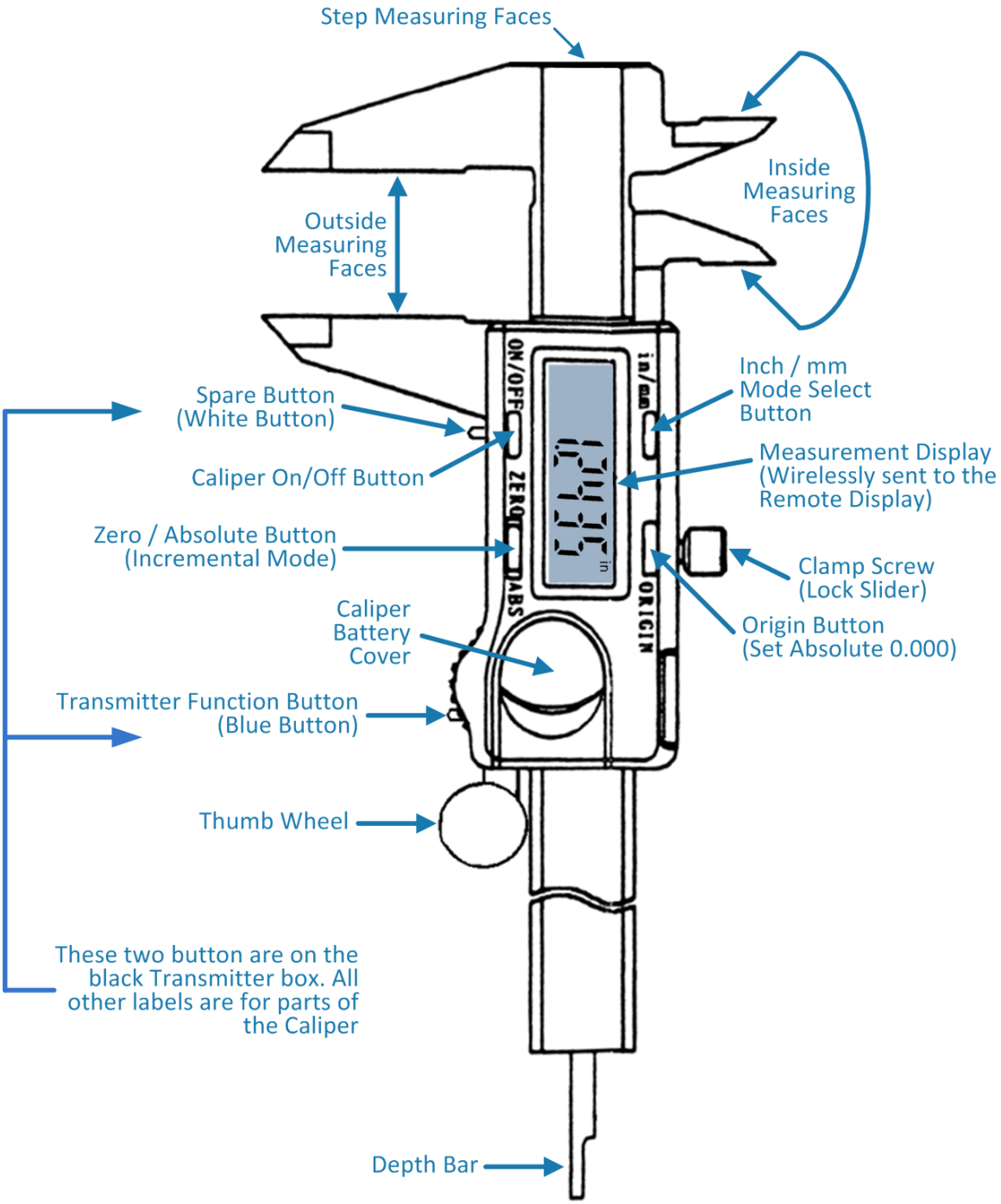
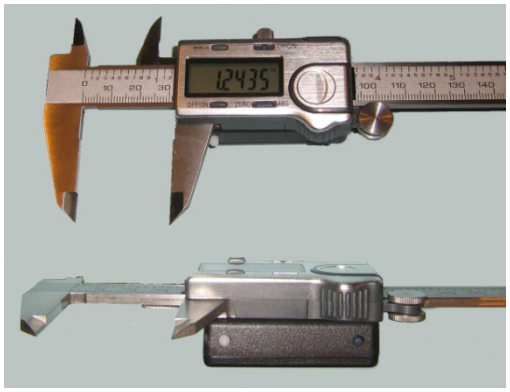
EasyReadTools 6"/150mm Caliper with Remote Display

Instructions (For TX V4.0c, RX 3.2a)





EasyReadTools 6”/150mm Caliper

Remote Display

Expected Use:

The motivation for creating this product was my experience with doing setup and in process checks on a milling machine and lathe, for prototype work and first article. Often, fixtures or cutting tools (on a lathe) obstruct or hinder making measurements with the Caliper and then reading the measurement from the display. Work pieces clamped in a vice are close enough to the mill's table that the Caliper's beam prevents using the Caliper with the display facing the user. On a lathe, I often find I want to make measurements near the headstock and I don't want to move the cutting tools. Consequently, the Caliper comes in from behind the work piece, and the display is facing the headstock. Moving the Caliper to see the display causes errors of several thousandths as the Caliper is slid out. The locking screw on a Caliper makes it a two handed operation. The Remote Display solves all these problems with a large, backlit display that is very easy to read (especially for those of us still in denial about our need for glasses). If you think about it, about half of all measurements with a Caliper will have the display facing away from you. It's even worse if you are a lefty, or are tortured by Murphy’s Law.

Product Details:

The underlying measurement tool is a standard 6" digital Caliper, with typical ±0.0005" resolution and ±0.001" accuracy. The wireless system does not affect resolution or accuracy. The value on the Remote Display is updated approximately three times per second. Wireless range is over 20 feet (over 6 meters). The Remote Display has two strong magnets embedded in the back, so it can be attached to any suitable metal surface (steel/iron/tin but not aluminum and some stainless steels).

The Caliper has 4 Momentary Push Buttons:

On/Off Turns the Caliper on or off. The Caliper will auto turn on with any movement of the jaws and auto turn off when not in use for a few minutes. When the Caliper turns on, the Transmitter is also turned on automatically. The Remote Display must be turned on by pressing the **Blue** button on the top of the Remote Display box.

Zero/Abs Switch between Absolute measurement mode (closed jaws for 0.0000) and Incremental measurement mode (set a temporary Zero at the current Caliper position). The Caliper display shows "inc" when in Incremental mode. A new temporary Zero can be set by pressing this button again. Press and hold this button until the "inc" is no longer shown, to return to the default, Absolute mode. The Remote Display shows the same measurement as the Caliper, but it does not include the "inc" mode indication.

Inch/mm Switch between inch and mm mode at any time. Caliper shows either "in" or "mm" on the right side of its display. The Remote Display also shows the current mode.

Origin Set the absolute origin. Clean the outside measurement jaws and close tightly by pressing on the jaws (not by pressing on the thumb wheel), then press this button for 5 seconds. The display should show 0.0000. Typically, this procedure is only performed after changing the Caliper battery.

The Transmitter on the Back of the Caliper has 2 Buttons:

White Spare Button. This button is not used in the current version of the product. (This product is still in development, and a previous version used this button as the Transmitter On/Off switch.)

Blue Several functions are activated by this button. A **click** is a short activation of the button, similar to the way you click a mouse button. A **press** is pressing the button for longer than a second.

- **Single Click**: Start or end **Hold Mode**. In Hold Mode, the Remote Display holds the measurement value at the start of the single click. Hold Mode is indicated by the flashing letter 'H' at the right end of the display window on the Remote Display. End Hold Mode by another single click. The mode will also automatically end after about 30 seconds. While the Remote Display is in Hold Mode, the Caliper can still be used, but the new measurement values will only be shown on the Caliper's display.
- **Single Press**: Change the Remote Display backlight “ON” duration. The Remote Display backlight turns on automatically whenever a change in measurement value occurs, and remains on for 5 seconds as the default. A single press will change this duration to 15 seconds, and another single press will return it to 5 seconds. When the system is turned off, the backlight “ON” duration is reset to the default of 5 seconds.
- **Double Click** (similar to a double click on a mouse): The Remote Display shows the status of the battery in the Caliper, the Transmitter, and the Remote Display.
- **Triple Click**: The Remote Display shows the system serial number, the owner's name, and various configuration information that may be needed by EasyReadTools for problem solving.

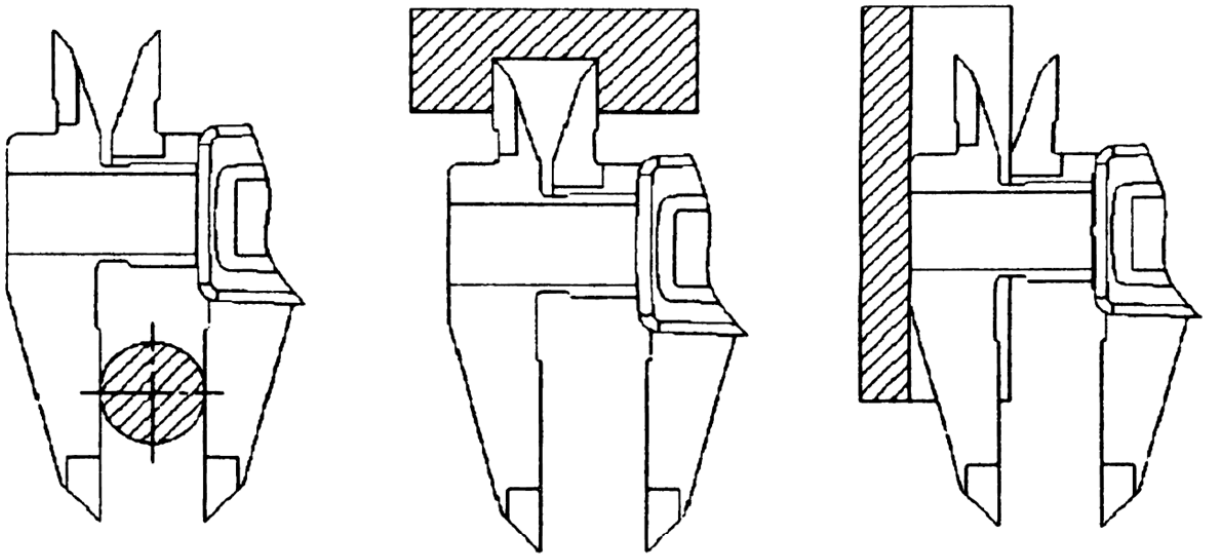
The Remote Display has 1 Button:

Blue Press once to turn the Remote Display on, press again to turn it off. The Remote Display will also automatically turn off, if the Caliper has been off for more than 30 seconds.

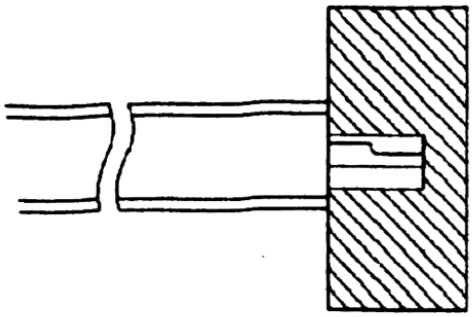
Making Measurements:

The Caliper and the Transmitter automatically turn on when the jaws are moved. Additionally, the On/Off Button also turns the Caliper on/off. Both the Caliper and the Transmitter automatically turn off if not used for about 5 minutes.

The Calipers has 4 Measurement Surfaces



Outside Measurement **Inside Measurement** **Step Measurement**



Depth Measurement

How to use this Product:

Turn on power to the Caliper either by moving the jaws or by pressing the Caliper On/Off Button. As with most high quality Calipers, the Caliper remembers the absolute origin (0.0000 when the jaws are closed), so there is no need to reset the origin each time the Caliper is turned on. Moving the Caliper jaws while the Caliper is turned off does not affect the origin.

The Wireless Transmitter automatically turns on when the Caliper turns on, and turns off when the Caliper turns off. There is no direct indication that the Transmitter is on.

Turn power to the Remote Display on by pressing the only button on the unit, and off, by pressing this button again. The Remote Display automatically turns off if the Remote Display value does not change for 5 minutes.

There are two ways to use this product: one is as a normal Caliper, and the other is using the Remote Display feature. As a normal Caliper, the usage is no different from any other digital Caliper with which you are already familiar. The first page indicates the locations of the various buttons, their functions, and the four measurement surfaces.

To use the Remote Display feature, just turn on the Remote Display, and use the Caliper normally.

The Remote Display shows the same measurement value as that presented on the Caliper's digital display, except in Hold Mode. The Remote Display backlight turns on automatically whenever a change in measurement value occurs, and remains on for 5 seconds as the default. This duration can be changed to 15 seconds (see the **Blue** Function Button description on page 3). The backlight auto turn-off feature saves battery power, prolonging the usage life of the batteries in the Remote Display.

With the two powerful magnets embedded in its back surface, the Remote Display can be conveniently and securely positioned on many of the metal surfaces of milling machines, VMCs, lathes, etc. The Remote Display can just as easily lie flat on a desk or work bench when you might use it to make measurements of a work piece and you prefer the large, easy-to-read, backlit display of the Remote Display to the small display of the Caliper.

Caliper Specifications

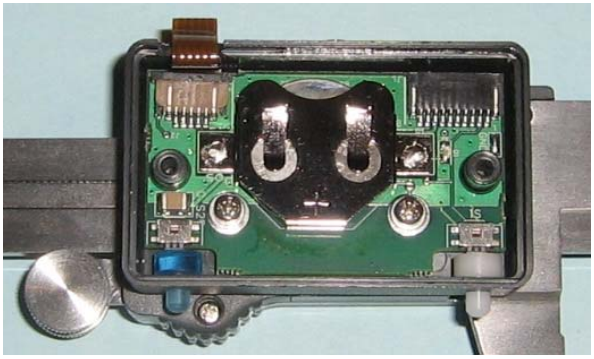
Resolution: ±0.0005" (±0.012 mm)
Accuracy: ±0.001" (±0.024 mm)
Power: button cell (CR1632),3.0V
Battery life: more than 2.5 years under normal operation
Response speed: Unlimited (no limit to how fast the slider is moved)
Protection rating: IP40
Operating environment: temperature 32°F to 104°F (0°C to +40°C)
Relative humidity <80%
Storage temperature: 14°F to 122°F (-10°C to +50°C)

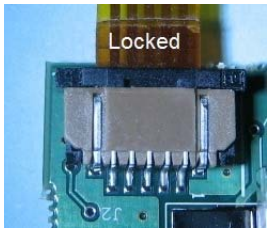
Replacing Batteries:

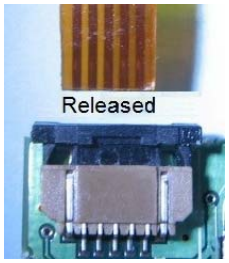
Transmitter Battery, CR2032:

The Transmitter battery is in the small black box on the back of the Caliper. This operation requires some disassembly and there are several small parts. Perform the disassembly on a clean desk with a container to hold the small parts while changing the battery. A small Phillips head screwdriver is required.

1. Open the box by unscrewing two external screws on back of Transmitter.
2. Carefully note the location of the two buttons (white and blue) and the box orientation with respect to the Caliper.
3. Remove the circuit board by unscrewing the two internal screws. If there are washers on the screws, be careful not to lose them. The circuit board can now be removed from the box. The brown flex circuit connecting the circuit board to the Caliper is very delicate. If you wish, you can release the flex circuit from the circuit board by first sliding the black part of the connector away from the board. This releases the flex circuit from the connector. (Later you will need to re-insert the flex circuit and slide the black part back to the original position, to lock the flex circuit in place.







4. Remove the old battery and replace it with a new CR2032 battery. Install it with the negative terminal (the side with the black ring) facing the circuit board, and the positive terminal (flat metal with product info marked on it) facing up.
5. Re-assemble the flex circuit, if you previously removed it.
6. Insert the circuit board back into the box, making sure that the buttons are in their correct positions and are free to move.
7. Attach the board and box to the Caliper with the two internal screws that were previously removed. Check that the Caliper still slides correctly. If there were washers on the screws that hold the circuit board and box onto the Caliper, and you lost them, then the screws go in too far and interfere with the Caliper's sliding movement.
8. Re-attach the lid, pushing any slack flex circuit into the box as the lid is tightened in place. To avoid cross-threading the lid screws, turn them counter-clockwise in the hole until you feel the thread catch the prior thread in the box. Then tighten each screw, being careful not to over tighten, as it will strip the plastic. Don't force anything.

The battery life for the Transmitter is not yet known, but is probably more than a year.

Caliper Battery, CR1632:

The Caliper battery should have an operational life of greater than 2.5 years under normal operation. Low battery voltage is indicated on the Caliper by a blinking low battery icon. The battery condition can also be checked by double clicking the **Blue** Transmitter Function Button, and monitoring the voltage shown on the Remote Display.

To replace the Caliper battery:

1. Slide the battery cover off and remove the old battery.
2. Replace it with a new CR1632 battery. Install it with the "+" sign facing outward.
3. Slide the cover back on.
4. Regardless of what the Caliper's display indicates, be sure to re-establish the absolute origin after installing a new Caliper battery:
   a. Clean the outside measurement jaws and tightly close them by pressing the jaws together, not by using the thumb wheel.
   b. Press the Origin Button for 5 seconds. The display should show 0.0000.
   c. If the Origin setting does not work, remove the battery for 30 seconds, then re-install it and perform step 4. b again.

Remote Display Battery, 3 x AAA Alkaline:

1. Undo the four corner screws.
2. Replace all three AAA batteries with new cells; don't mix old with new. The strong magnets in the bottom of the box can pull the batteries out of the battery holder, so after installing the batteries in the battery holder, wrap the assembly with a layer of thin adhesive tape.
3. When closing the box, the magnets tend to pull the battery assembly into the middle, and the box can't be closed. So, here's what I do:
   a. Cut a 1" wide by 8" long strip of paper (any scrap page of letter size paper will do).
   b. Wrap the strip around the battery holder so that the battery holder is in the middle and you have two 3" lengths of paper that you can use to position the battery against the side of the case that does not have the On/Off Button.
   c. Place the lid on the box and then with it almost closed, slide the strip of paper out.
   d. Snap the lid in place. It's easier than this description makes it sound.
   e. To avoid cross-threading the lid screws, turn them counter-clockwise in the hole until you feel the thread catch the prior thread in the box. Then tighten each screw, being careful not to over tighten, as it will strip the plastic. Don't force anything.

Battery life for the Remote Display is not yet known, but is probably at least 6 months. To prolong battery life, turn off the Remote Display when you are finished making measurements, rather than leaving it to auto turn off after 5 minutes of being idle.

Product Safety:

To ensure user safety, use this Caliper in conformance with the specifications, functions and directions provided in this User's Manual. Do not disassemble, short-circuit, charge, or heat the battery. If a battery is swallowed, immediately consult a doctor. The outside and inside measuring jaws of this Caliper have a sharp edge. Handle it with care to avoid injury.

Never apply a voltage (e.g. engraving with an electric engraver) on any part of the Caliper as it will damage the Caliper electronics.

Avoid getting the product wet with water or coolant. Immersing the Caliper in coolant will probably ruin it. When cleaning the Caliper, the sliding surfaces can be lubricated with light oil.

The front of the LCD in the Remote Display is a soft material and can be easily scratched. If it needs to be cleaned, use a damp (not wet), soft cloth. A small amount of light detergent can be used. After wiping the surface with the damp cloth, dry it with a dry soft cloth. Do not press hard on the LCD surface. Do not use solvents.