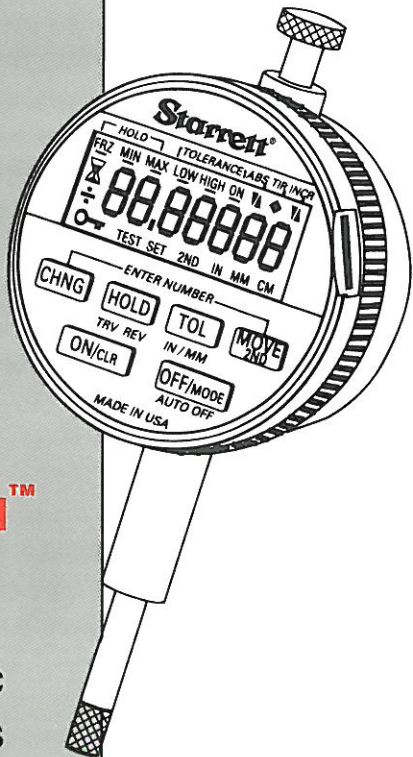


Starrett®

OPERATING MANUAL



WISDOMTM
PLUS

Series
Electronic
Indicators

Choice of Three Power Sources

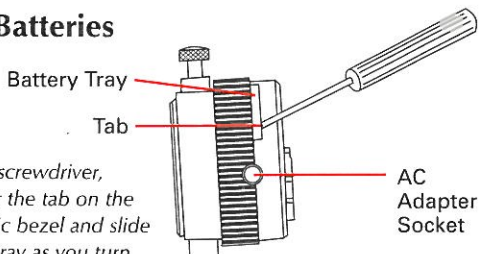
1. Batteries

A set of two Manganese Dioxide Lithium batteries will operate this electronic indicator for approximately 250 hours of normal usage. Because battery capacity varies widely with manufacturers, normal usage time is very hard to predict. The lithium battery used in this indicator is an IEC standard, type CR2450, L.S. Starrett #61120.

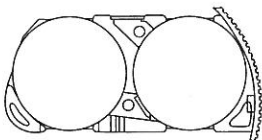
NOTE: This indicator has an "AUTO-OFF" feature to conserve battery life. After 10 minutes of "no activity" (no key presses or spindle movement), the gage will turn itself off. This feature may be disabled if continuous operation is desired; see "AUTO-OFF on/Off" instructions in this book.

Installing Batteries

Using a narrow screwdriver, gently pry under the tab on the left side of plastic bezel and slide out the battery tray as you turn the indicator face side down.



Insert two batteries, "+" side up, into tray cavities, then slide the tray back into its bezel slot, taking care that the batteries stay in proper position.



2. AC Adapter

AC adapters (providing 9VDC at 30ma, maximum to the indicator from a 110 or 220 VAC, 50/60 Hz line source) may be purchased from Starrett. Although other 9V AC adapters with a 3/32" (2.5mm) mini-plug (center +) may be used, Starrett adapters are recommended because they include current limiting to prevent damage from line fluctuations.

For 110 V (USA) operation – Order Starrett
Part No. PT26413

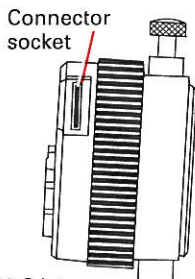
For 220 V (Europe) operation – Order Starrett
Part No. PT26541

First insert the mini-plug into the socket on the lower left side of the bezel (see drawing page 2), then plug the adapter into a wall outlet. After turning the indicator "ON", disable the "AUTO-OFF" feature; see "AUTO OFF On/Off" on page 8.

Disabling the "AUTO-OFF" feature will enable continuous use of the indicator.

3. Data I/O Connector

Power also may be provided through the data I/O connector, for special fixturing or application where the indicator is integrated with another piece of equipment. A ripple-free 5 VDC (4.9 to 5.1V) regulated voltage source is required. Use Starrett Part No. PT61489 and PT61490 Cable and Module for Starrett No. 741, 742 and 772 Multiplexer and Data Collectors, No. PT26416 to Starrett No. PT26412 Printer.



Display-Operating Prompts and Conditions

Menu selection items under **HOLD** or **TOLERANCE** areas.

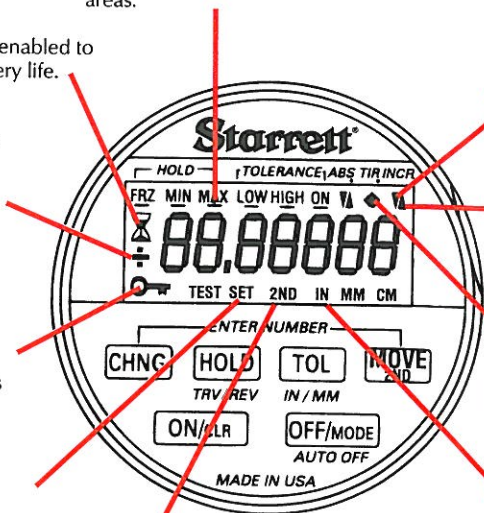
AUTO-OFF is enabled to conserve battery life.

Negative reading. No sign is displayed for positive readings.

Features and preset numbers are locked. Entering or changing of presets or 2ND/3RD function changes is prohibited.

Indicator is in preset-number-setting function for **ABS** or **TOLERANCE HIGH** or **LOW** preset numbers.

Indicator ready for 2ND or 3RD function key entry sequences.



Travel reversed; display counts **DOWN** with inward spindle movement for **INCR** and **ABS**

For **INCR** and **ABS** measurement modes, display counts **UP** with inward spindle movement. This is the normal setting.

For **TIR** measuring mode, travel direction is ignored.

Displays **IN** for English (inch), or **MM** for Metric measure units.

Display-Operating Prompts and Conditions

(continued . . .)

FLASHING DIGIT OR +/- sign — Digit or sign affected by **CHNG** key when setting or changing preset numbers.

FLASHING READING, with HIGH or LOW displayed — Reading is out of tolerance, to high or low side.

ERROR 1 — Spindle speed too fast, high electrical noise, battery needs replacing, etc.

ERROR 2 — Counter overflow, i.e., counter number (spindle preset number) out of counter range.

ERROR 3 — Improper tolerance combination, i.e. both "HIGH" and "LOW" set to "0" or same number, or "LOW" set to a higher number than "HIGH". Occurs only when "TOL" is on.

ERROR 4 — Display overflow, i.e. number too large to be properly displayed. Moving spindle to acceptable range eliminates error message.

Measurement Modes

Three measuring modes are available with the WISDOM PLUS and remote display measuring systems:

1. **"INCR" — Incremental Measurement** — The displayed reading is the distance from a "zero" reference, which may be the base of a precision test stand, etc. "Zero" may be set at any point of spindle travel by pressing/releasing "ON/CLR" (with "HOLD" off).
2. **"TIR" — Total Indicator Readings** — The displayed reading is the difference between the highest and lowest spindle positions while moving the part under the spindle contact. This mode is most useful for checking roundness of shafts, surface flatness, etc. Special fixturing may be needed to hold both the indicator and the part. "Zero" may be set at any point on the part by pressing/releasing "ON/CLR" (with "HOLD" off). The exact location of "zero" is not important for accurate TIR measurements.
3. **"ABS" — Absolute or Preset Measurement** — The displayed reading is the distance from the "preset" reference, which is set at any point of spindle travel by pressing/releasing "ON/CLR" (with "HOLD" off) while the spindle point is resting on a precision gage block or other reference standard. The "ABS" (preset) number must match the dimension of the precision reference. See "To Set Absolute/Preset Numbers" on page 8.

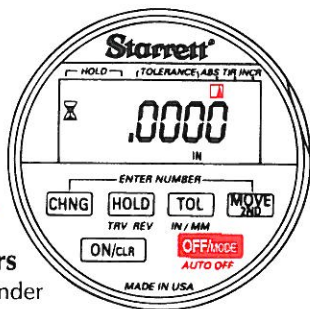
NOTE: Accuracy of "ABS" measurements is the *sum of the accuracies* of the precision reference *and* the indicator. For example, if the indicator resolution/accuracy is ± 0.00005 " and the accuracy of the reference is ± 0.0001 ", the reliable measurement accuracy is ± 0.00015 ". Therefore, it is important to use the most accurate reference standard.

Operating Instructions

To Enter

Absolute/Preset Measuring Mode

- Press and hold **OFF/** **MODE** until cursor appears under ABS



To Set

Absolute/Preset Numbers

NOTE: Be sure the cursor is under ABS.

1. Press and release **CHNG** and **MOVE 2ND** simultaneously.
Note: SET appears at bottom of display.
2. Press and release **MOVE 2ND** until the +/- sign or the digit to be set is blinking.
3. Press and release **CHNG** to reverse the +/- sign or increment the blinking digit.
4. Repeat steps 2 and 3 until desired number is entered.
5. Press and release **CHNG** and **MOVE 2ND** simultaneously to save number.

To Turn

AUTO OFF On/Off

- Press and hold **MOVE 2ND** until **2ND** appears at bottom of display, then release.
- Press and release **OFF/MODE** within 3 seconds.
Note: An hour glass appears at left side of display if AUTO OFF is active.

To

Clear Display . . .

to zero or an Absolute/Preset #:

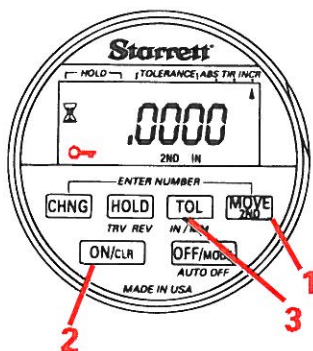
- Press and release **ON/CLR**.

To Turn

FEATURE LOCK On/Off

Prevents inadvertent changing of functions, presets, etc.

1. Press and hold **MOVE 2ND** until **2ND** appears at bottom of display, then release.
2. Press and release **ON/CLR** within 3 seconds.
3. Press and release **TOL** within 3 seconds — and a key symbol will appear at the bottom-left of display when features are locked.



To Use **HOLD**

To select type of HOLD — Freeze, Minimum or Maximum:

- Press and hold **HOLD** until cursor moves under desired **FRZ**, **MIN** or **MAX**, then release.

To turn HOLD On/Off:

- Press and release **HOLD**

To Change **INCH/MILLIMETER**

To change from one to the other:

- Press and hold **MOVE 2ND** until **2ND** appears at bottom of display, then release.
- Press and release **TOL** within 3 seconds. Note: **MM** or **IN** will appear at bottom of display.

To Enter **Incremental Measuring Mode**

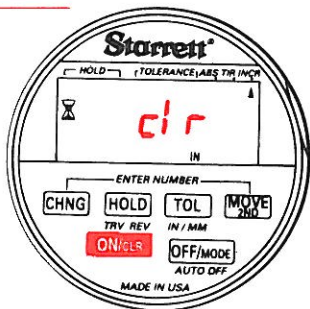
- Press and hold **OFF/MODE** until cursor is under **INCR**, then release.

To Turn **INDICATOR ON**

- Press **ON/CLR** and release when **CLR** appears.

To Turn **INDICATOR OFF**

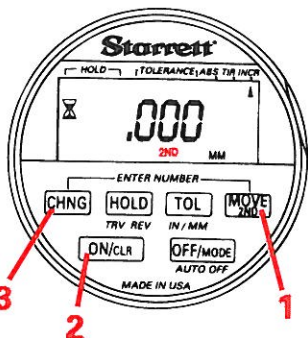
- Press and release
OFF/MODE



To Reset to DEFAULT

A total reset: clears all settings and returns to factory-set defaults . . .

1. Press and hold **MOVE 2ND** until **2ND** appears at bottom of display, then release.
2. Press and release **ON/CLR** within 3 seconds.
3. Press and release **CHNG** within 3 seconds.
Note: Cannot be done if Lock feature is on.



To Change RESOLUTION

- Press and hold **MOVE 2ND** until **2ND** appears at bottom of display, then release.
- Press and release **ON/CLR** within 3 seconds.
- Press and release **HOLD** within 3 seconds.
- Use "**CHNG**" key to step through available resolution selections:

1 = .00005"	(.001mm)
2 = .0001"	(.002mm)
3 = .00025"	(.005mm)
4 = .0005"	(.01mm)
5 = .001"	(.02mm)
- Press and release **CHNG** and **MOVE 2ND** simultaneously to save. NOTE: Only resolutions coarser than indicator resolution-as-purchased are available.

To Enter

TEST Mode

- Press and hold (for more than 5 seconds) **ON/CLR** to enter/exit display and key test mode.
-

To Enter

TIR Measuring Mode

- Press and hold **OFF/MODE** until cursor is under **TIR**, then release.
-

To Set

TOLERANCE Numbers

- Press and hold **TOL** until cursor is under **HIGH**, then release. See steps 1-5 on page 8, under "absolute/ Preset Numbers" to set **HIGH** tolerance. After step 5 is completed, the cursor will automatically move to **LOW**.
 - Repeat steps 1-5 to set **LOW** tolerance.
-

To Turn

TOLERANCE On/Off

- Press and release **TOL**
-

To Change

TRAVEL DIRECTION

- Press and hold **MOVE 2ND** until **2ND** appears at bottom of display, then release.
- Press and release **HOLD** within 3 seconds.
NOTE: Arrow under **ABS-INCR** will show positive direction of spindle travel.

NOTE: Most functions are active on release of key(s).

TOLERANCE Numbers

"LOW" Defined

Stores the dimension displayed when **LOW** is pressed. Subsequent readings which are lower (less positive) will cause the display to FLASH, indicating that the low limit setting has been exceeded.

NOTE: **HOLD** and **LOW** functions cannot be used in combination, i.e. pressing **HOLD** will cancel **LOW** function and clear the low setting.

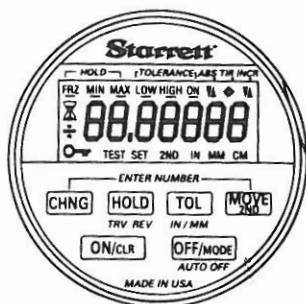
"HIGH" Defined

Stores the dimension displayed when **HIGH** is pressed. Later readings which are higher (less negative) will cause the display to FLASH, indicating that the high limit setting has been exceeded.

NOTE: **HIGH** may be used in combination with **LOW** or **HOLD** functions.

Control Key Functions

NOTE: Most functions are active on release of key(s).



KEY	FUNCTION CONTROLLED
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OFF/MODE	<u>Press and Release</u>: Turns indicator off. <u>Press and Hold</u>: Selects measuring mode — INCR, TIR or ABS — in rotating sequence. Release key when prompt indicates desired mode.
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ON/CLR	<u>Press and Release</u>: Turns indicator on, or clears/resets indicator. • With HOLD off: Clears display to "0" (or to ABS number, if in ABS mode.) • With MAX or MIN with HOLD on: Clears display to spindle position* • With FRZ (Freeze) with HOLD on: - In INCR or ABS mode, clears to spindle position*, turns HOLD off. - In TIR mode (defaults to FRZ), clears to "0" and turns HOLD off.
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Press and Hold (for longer than 5 seconds): Enter/Exit display and key test mode.

*Or spindle position — absolute number, if in ABS.

TOL

Press and Release: Turns tolerance function on/off. (If ERROR 3 appears, no tolerance numbers or an invalid tolerance number combination is stored in memory, i.e. either "0" or LOW number is higher than the HIGH number.)

Press and Hold: **ON**, **HIGH** and **LOW** are displayed in rotating sequence. Release key when cursor is under desired selection.

HOLD

Press and Release: Turns hold function on/off and cancels last selection.

Press and Hold: **MAX**, **MIN** and **FRZ** (Freeze) are displayed in rotating sequence. Release key when cursor is under desired selection.

MOVE 2ND

Press and Hold (for more than 2 seconds until **2ND** is displayed): Enables 2ND and 3RD functions such as **TR REV** (Travel Reverse), **IN/MM** and **AUTO OFF**.

Press and Release: Used with **CHNG** to activate set functions in **ABS**, **HIGH** and **LOW**.

CHNG

Used with **MOVE 2ND** key to activate set functions in **ABS**, **HIGH** and **LOW**.

Internal Memory

WISDOM Series indicators and remote displays include internal non-volatile memory to store all factory default and user settings. When the indicator is turned on, user settings and preset numbers will be the same as when the indicator was turned off.

NOTE: Many of the user settings are stored when the indicator is turned Off by using the OFF/MODE key, or when the indicator turns itself off. By removing power (disconnecting the AC adapter or cutting power through the Data I/O connector), some or all of the user settings and/or changes may be lost!

Operating Precautions

1. Do not use the bottom of the spindle stroke as a base of measurement reference, as it is protected with a rubber shock absorber to prevent shock to the internal mechanism. The spindle should be offset .005 – .010" (.12 – .25mm) from the bottom of travel.
2. Use of Starrett No. 653 or similar sturdy stands or fixtures for indicator mounting, where the base plate and indicator are mounted to a common post, is highly recommended for accurate and repeatable readings. The indicator must be mounted with the spindle perpendicular to the reference or base plate. If the indicator is stem-mounted, protect the indicator from attempted rotation, and from being struck or bumped, to prevent stem/case mechanical alignment damage. Do not over-tighten the

mounting mechanism, and use clamp-mounting rather than set screws if at all possible, to prevent damage to the stem.

3. The bezel face can be rotated from its normal horizontal position for convenient viewing. Rotation is limited to 270° and attempts to force it past its internal stop may damage the indicator.
4. Frequently clean the spindle to prevent sluggish or sticky movement. Dry wiping with a lint-free cloth usually will suffice, but isopropyl alcohol may be used to remove gummy deposits. Do not apply any type of lubricant to the spindle. Spindle dust caps and spindle boots are available for operation in dirty or abrasive environments.

1" Spindle Dust Cap — Order Starrett Part # PT26542

1" Spindle Boot — Order Starrett Part # 09545

Use a soft cloth dampened with a mild detergent to clean the bezel and front face of the indicator. Do not use aromatic solvents as they may cause damage.

5. Extremely high electrical transients — from nearby arc welders, SCR motor/lighting controls, radio transmitters, etc. — may cause malfunctions of the indicator's internal circuitry or "ERROR 1" indications, even though the electronic design was created to minimize such problems. If at all possible, do not operate the indicator in plant areas subject to these transients. Turning the indicator "OFF" for a few seconds, then back "ON" from time-to-time may eliminate any problems. Also, use of an isolated AC line (for AC adapter operated indicators and AC powered remote displays), or an AC line filter — plus solid grounding of stands and fixtures — is recommended in these conditions.

Data Output

BYPASS FORMAT — Permits indicator to be used as a probe for the Starrett remote display: bypasses "raw" unprocessed signals from the detector system directly to the data output connector. In this operation mode, power for the indicator is supplied by the remote display.

Cable required: Starrett Part No. PT26415 –
Starrett indicator to 6-pin DIN

Limited Warranty

"PLUS SERIES" INDICATORS ARE WARRANTED FOR A PERIOD OF ONE YEAR AGAINST DEFECTIVE MATERIALS OR WORKMANSHIP. THIS WARRANTY DOES NOT APPLY TO PRODUCTS THAT ARE MISHANDLED, MISUSED, ETCHED, STAMPED, OR OTHERWISE MARKED OR DAMAGED, NOR DOES IT APPLY TO DAMAGE OR ERRONEOUS OPERATION CAUSED BY USER TAMPERING OR ATTEMPTS TO MODIFY THE INDICATOR. UNITS FOUND TO BE DEFECTIVE WITHIN THE WARRANTY PERIOD WILL BE REPAIRED OR REPLACED FREE OF CHARGE AT THE OPTION OF THE L. S. STARRETT COMPANY. A NOMINAL CHARGE WILL BE MADE FOR NON-WARRANTY REPAIRS, PROVIDED THE UNIT IS NOT DAMAGED BEYOND REPAIR.



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