

# User Manual

## 2900 Series Electronic Indicator



## Table of Contents

Guidelines for Indicator Care .....	2
Operating Instructions.....	3
Indicator Components, Dimensions & Layout .....	3
Button Functions.....	4
2900 Indicator Models, Feature Level & Resolution .....	5
Resolution Selection* .....	5
Setting the PRESET Function* .....	6
Setting MIN/MAX Limits (Go/No Go)** .....	6
Displaying MIN/MAX/TIR Values** .....	8
Lock Mode* .....	8
Data Output Connection .....	9
Battery Installation.....	9
Appendix A: Technical Specifications.....	10
Appendix B: Serial Output Connector.....	11

\* Available with Standard & Advanced Features

\*\* Available only with Advanced Features

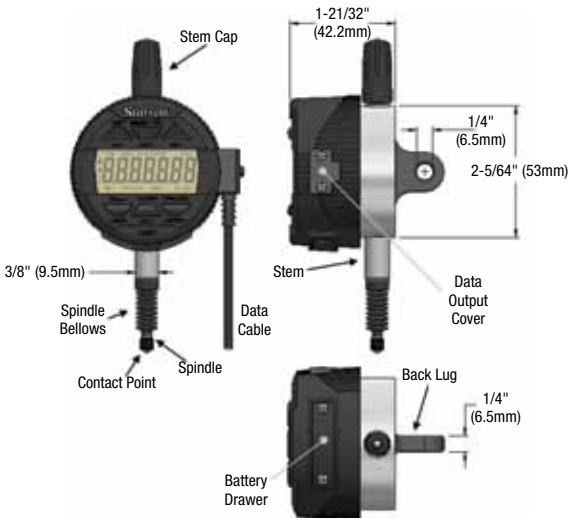
### Guidelines for Indicator Care

1. Avoid dropping the indicator.
2. Avoid extreme temperatures and direct sunlight for extended periods.
3. Avoid contact with liquids and dusty environments.
4. Avoid shocks to the contact point and spindle.
5. Do not apply radial force to the spindle.
6. If the indicator is stem-mounted, protect it from being hit or bumped to avoid stem/case mechanical alignment damage.
7. Do not over-tighten the mounting mechanism. If possible, use clamp mounting rather than set screws to prevent damage to the spindle.
8. Clean the spindle frequently with a dry cloth or a chamois to prevent sluggish or sticky movement. Isopropyl alcohol may be used to remove gummy deposits on metallic parts. Do not apply lubricant to the spindle or use solvents.
9. Do not disassemble or modify the indicator.

## Operating Instructions

1. Install batteries (included with indicator).
2. Lightly clean the contact point.
3. Secure the indicator to an appropriate holding device.
4. Press the ON/OFF button to turn the indicator on.
5. Select the unit of measure (inch or millimeter) by pressing the IN/mm button. (Not applicable to metric indicator models).
6. Place the indicator perpendicular to the reference surface being measured. Allow enough movement to be able to take a higher or lower measurement.
7. Press the ZERO button to reset the display.
8. Lift the spindle, remove the reference surface and place the work piece to be measured. Put the spindle carefully on to its surface. The measured value will be shown on the LCD.
9. Press and hold the ON/OFF button to turn the indicator off. If left unattended, it will turn off automatically in 30 minutes.

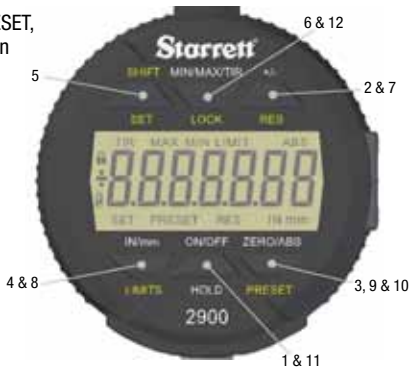
## Indicator Components, Dimensions & Layout



## Button Functions

LOCK, RES, LIMITS and PRESET, printed in yellow, are used in conjunction with the SHIFT button.

To engage press the SHIFT button first. The SET icon will appear on the bottom left corner. Then press the button for the desired function.



1	ON/OFF	Power button. Press and hold for 4 seconds.
2	+/-	Plus/Minus sets the direction of the reading
3	ZERO	Half a second after releasing the ZERO button the display will zero. Do not move from zero during that half second.
4	IN/mm	Toggles the display between English or Metric modes.
5	SHIFT/SET	Dual function. To enable the Lock, Resolution Selection, Preset or Limits (Go/No Go) function. When enabled, SET icon will show in the bottom left corner of the display.
6	LOCK	Prevents operator modification to the Settings. Press SHIFT/SET button, then press and hold the LOCK button (after setting the other functions).
7	RES	Resolution. First select the Unit (English/Metric). Press SHIFT/SET then the RES (Plus/Minus) buttons. Press the RES button to scroll through choices and press the SHIFT/SET to make the selection.
8	LIMITS	Sets the Min and Max values for the Go/No Go function.
9	PRESET	Press the SHIFT/SET button then press the PRESET button to enable the PRESET function.
10	ZERO/ABS	Dual Function. Press and hold for two seconds to activate the ABS mode or to exit the ABS mode. To zero the display, see #3 above.
11	HOLD	Press HOLD momentarily to capture a reading. The captured reading will flash on and off. To disable, press the HOLD button again.
12	MIN/MAX/ TIR	Displays the minimum or maximum values captured during operation. The TIR function displays the difference between the captured readings.

## 2900 Indicator Models, Feature Level, Resolution & Range

Cat. No.	EDP	Description	Resolution	Range
2900-1	09980	Basic English/Metric	.00005"/.001mm	.5"/12mm
2900-2	09981	Basic English/Metric	.0001"/.001mm	.5"/12mm
2900-4	09983	Standard English/Metric with Selectable Resolution	.0005"/.0001"/.00005" .01mm/.001mm	.5"/12mm
2900-6	09985	Advanced English/Metric with Selectable Resolution	.0005"/.0001"/.00005" .01mm/.001mm	.5"/12mm
2900-1M	09986	Basic Metric	.001mm	12mm
2900-4M	09988	Standard Metric with Selectable Resolution	.01mm/.001mm	12mm
2900-6M	09990	Advanced Metric with Selectable Resolution	.01mm/.001mm	12mm

### Resolution Selection\*


Enter the resolution SET mode by pressing the SHIFT/SET button followed by the RES button. The choices are displayed sequentially from highest to lowest. The round off accommodates the range of values in the table (right).




After selecting the desired resolution, press the SET/SHIFT button to exit the resolution mode. When the mode is entered, the resolution selection is presented in the units previously set (English or metric). Press IN/mm to toggle units selection, as required.

Round Off Condition	English Inch Mode	Metric mm Mode
Round Off Enabled	000.00005	0000.001
Round Off Disabled	000.0001	0000.001
Round Off Enabled	000.0005	0000.01
Round Off Disabled	000.001	0000.01

Press  Then  to enter Resolution Mode

Press  to cycle through the available resolutions

Press  to pick the resolution and exit resolution mode


\* Available with Standard & Advanced Features


## Setting the PRESET Function\*

1. To set a value, press and hold the ZERO/ABS button until the ABS icon appears in the upper right corner of the LCD (right). The values can be SET to: +/-99.99999" or +/-9999.999mm.
2. Press the SHIFT/SET followed by the PRESET button. The SET and PRESET icons will appear in the lower left corner of the LCD. The PRESET icon will be flashing (middle right).
3. To move from the PRESET icon to a digit, press the SHIFT/SET button. A flashing digit indicates that it is ready to be SET (lower right). Press the PRESET button to increment the value. To set, press the SHIFT/SET button.
4. To move to the next digit press the SHIFT/SET button and repeat step 3. Repeat steps 2 and 3 until all the digits are SET.
5. To set a negative value, press PRESET when the plus/minus sign icon is flashing.
6. To exit the PRESET function, press the PRESET button when the PRESET icon is flashing. The SET value will remain displayed.
7. Press and hold the ZERO/ABS button to return to the active measuring mode.



Press  Then  to enter Preset Mode

Press  to cycle from digit to digit and back to preset

Press  to increment the value of the digit or the plus/minus sign

\*Available with Standard & Advanced Features

## Setting MIN/MAX Limits (Go/No Go Function)\*\*

1. Select the units to be displayed.
2. Press the SHIFT/SET button. The SET icon will appear in the lower left corner (right).
3. Press the LIMITS button. The MIN LIMIT icon will appear in the upper middle of the display.
4. Press the SHIFT/SET button. The LIMIT icon will flash on/off.
5. Adjust the spindle to the desired minimum value.



6. Press the SHIFT/SET button to capture the minimum value. The LIMIT icon will stop flashing.
7. Press the LIMITS button. The MAX LIMIT icon will appear on the LCD (right).
8. Press the SHIFT/SET button. The LIMIT icon will flash on/off.
9. Adjust the spindle to the desired maximum value.
10. Press the SHIFT/SET button to capture the maximum value. The LIMIT icon will stop flashing.
11. Press the LIMITS button. The LIMIT and the SET icon will remain on. The MAX and MIN icons will stay off as long as the reading is within the set limits. If the measurement is beyond the set limits the display will flash and the MIN or MAX LIMIT icon will indicate the direction the limit have been exceeded. To exit Press the LIMITS button.



Press  Then  to enter Min Limit Mode

Press  The LIMIT icon will flash on/off


Press  to increment the value of the digit or the plus/minus sign. →



Then press  To capture the minimum value. The LIMIT icon will stop flashing.


Press  The MAX icon will appear.

Press  The LIMIT icon will flash on/off.

Press  Adjust the spindle to the value that you want →



Then press  To capture the maximum limit. The LIMIT icon will stop flashing.

Press  The Indicator is now set up with a maximum and minimum limit range

Press  To exit the LIMIT mode.

\*\* Available with Advanced Features

**Displaying MIN/MAX/TIR Values\*\***

(TIR is "Total Indicator Reading")

Pressing the MIN/MAX/TIR button displays the MIN/MAX/TIR values most recently measured.

Press once for MIN (above right), twice for MAX (middle right) and three times for TIR (lower right).

Press a fourth time to exit. The MIN/MAX/TIR values may be zeroed by pressing the SHIFT/SET button.



\*\* Available with Advanced Features

**Lock Mode\***

The Lock Mode prevents intended or unintended operator modifications to the settings.

Before activating the Lock function, preset other functions to the desired settings: Plus/Minus for spindle direction, ABS mode, PRESET Reading, Units, Limits setting, and MIN/MAX/TIR settings. These values are stored in memory. Then, lock these settings as follows:

1. Press the SHIFT/SET then press and hold the LOCK button.
2. The Lock icon will turn on and stay on (see right). Once the lock mode has been activated, the operator will not be able to change ABS/Normal Mode, Limits, Units, PRESET, or MAX/MIN/TIR, but will have access to the zero function and be able to view MIN/MAX/TIR readings.
3. To deactivate the lock mode repeat the process used to enter the mode. Press the SHIFT/SET then the LOCK buttons. The lock icon will turn off and stay off.



Press



Then



to activate the Lock function

Press



Then



to deactivate the Lock function

\*Available with Standard & Advanced Features



## Data Output Connection

To connect an output cable, remove the two small Phillips screws as shown below. Then, remove the output port cover.

Plug in the cable and secure it with the same screws that held the cover. Orient the data cable plug as shown below. When not using output, replace the data cover to protect the electronics



## Battery Replacement

Remove the two Phillips screws that secure the battery drawer as shown below. Remove the battery drawer and discard the old batteries.

Place two new CR2032 batteries into the tray with the positive (+) side facing up. Slide the tray carefully into the indicator and secure with the two screws.

To order CR2032 batteries, specify: PT99492. EDP 65650



**Appendix A: Technical Specifications****Power Requirements and Current Consumption**

Battery	2 – CR2032 Lithium Coin Cells
	Capacity 240 mAh
Automatic Sleep Time	30 minutes of non-use

**SPC Serial Output**

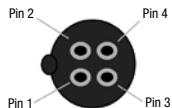
18 ASCII Characters	1 Space character
	2 Status characters indicating the operating mode
	BLANK Normal mode
	OL Displacement outside Lower Limit
	OU Displacement is outside the Upper Limit
	MN Displacement is minimum peak displacement stored
	MX Displacement is minimum peak displacement stored
	TR Displacement is the T.I.R. stored
	LL Displacement is the lower or minimum limit setting
	LU Displacement is the upper or maximum limit setting
	HL Displacement is a held displacement
	1 Sign character (minus but no plus)
	1 Space character (IN mode only)
	6 Digits
	1 Decimal point
	2 Spaces
	2 Character strings to indicate units “IN” or “mm”
	1 Carriage return
1 Line feed	

**Communication Protocol**

Baud Rate	4800
Data Bits	8
Parity	None
Stop Bits	2
Flow Control	None
Data Request and Response Timing	Receive High to Low Momentary
	Response Time Delay 120 ms
	Transmit Time 45 ms

**Appendix B: Serial Output Connector**

Pin 1	GND – Signal return
Pin 2	Serial Receive Data Input (RX/RQST)
Pin 3	Serial Transmit Data Output (TX/DATA)
Pin 4	Remote Zero – Special Order Only State Change High to Low

**Serial Input Voltage Level Specification**

Logic "0"	$V_{in} < 1.30$ Volts
Logic "1"	$V_{in} > 1.98$ Volts

**Serial Output Voltage Level Specification**

	Minimum	Maximum
Low Level	$V_{ss}$	$V_{ss} + 0.25$ @ -1.5mA Load
High Level	$V_{dd} - 0.25$ @ 1.25 mA Load	$V_{dd}$

Note:  $V_{ss} = 0$  Volts,  $V_{dd} = 2.7$  to 3.6 Volts

**Environmental Consideration**

Temperature	10-30 °C,
Humidity	30-85%RH (no condensation)
Atmosphere	Non-corrosive, Non-flammable

