



# Sonic Belt Tension Meter U-550 Operation Manual

This manual describes operation procedure of U-550.  
Please read this manual thoroughly before for full use of functions.

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# 1. Precautions



- Please read this precautions carefully. And Keep this manual safe for future reference.
- These precautions are written to defend the user to keep other people from harm, and to prevent other damages. Please pay attention to these precautions.
- These signs indicate the level of danger which can be expected by improper use.

 <b>Danger</b>	 <b>Warning</b>	 <b>Caution</b>
Imminently dangerous situation, such as death or severe injury	Can cause break down, injury, and electric shock	Injury or physical damages

	Things the user must NOT do.
	Things the user must do.

## **Warning**

	<b>Do not make strong impact or throw.</b> <ul style="list-style-type: none"><li>● Can cause breakdown and fire</li></ul>		<b>Do not break down or change.</b> <ul style="list-style-type: none"><li>● Can cause injury</li></ul>
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	<b>Do not use this in a flammable environment.</b> <ul style="list-style-type: none"><li>● Can cause an explosion or the fire when using this near propane gas or gasoline</li></ul>		<b>Do not put liquids such as water or solvents on the meter. Do not use the sensor in a wet or oily environment.</b>
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Please measure the tensile force after confirming the machine has been turned off.



Please turn off the power, immediately right after you hear a thunder noise and move to a safety place.

- Can cause an electric shock



## Caution



Avoid keeping at the place where much humidity, dust and high temperature are present.

- Can cause the break down



Do not use solvents (thinner and benzene, etc.) for maintenance.



Do not put on an unstable place like a sloping table.

- Can cause injury or breakdown



Even though the arm parts of the sensor are flexible, do not bend at an acute angle. Please do not bend it close to the head of the sensor (within 20mm from the sensor), and also do not bend it at the bottom of the sensor. Do not grab or twirl the cord strongly.



Do not leave or use this sensor in the direct sunlight or high temperature place.

## 2. Brief summary, caution & check points for failure

### ■ Brief summary

The sonic belt tension meter (U-550) is the handy equipment which enables to measure the tension accurately by analyzing sonic wave without touching.

A sensor catches the produced eruption of sound wave by pick the belt span. After that, the high processing computer analyzes it and shows the result on the screen digitally.

### ■ Check points for the immeasurable state

[Failed to measure or the results were fluctuated significantly.]

ITEM	PRESUMED	PRESUMED CAUSE	CONFIRMATION PONT
"Error" shows up or the measure mode can not be engaged or the red light on.	<ul style="list-style-type: none"> <li>● Nothing shows up or only measuring processing sign shows up from the third time of measurin (Frequency mode)</li> </ul>	<ul style="list-style-type: none"> <li>● "0" is entered to the unit mass, width &amp; span</li> <li>● Input the wrong frequency range</li> <li>● Measured frequency exceeds 5000Hz or below 10Hz</li> <li>● Battery drain</li> </ul>	<ul style="list-style-type: none"> <li>● Check the entered data (Input the correct number)</li> <li>● The frequency displays, but the tension does not measure</li> <li>● Change the measurement frequency range (LOW(V) ⇄ STANDARD ⇄ HIGH)</li> <li>● Check whether the measurement frequency exceeds 5000Hz or not</li> <li>● Battery drain</li> </ul>
The unevenness of the output level is large.	<ul style="list-style-type: none"> <li>● The measured value changes every time greatly</li> <li>● The sensor responds to the background noise keenly</li> </ul>	<ul style="list-style-type: none"> <li>● The sensor attaches to a belt for a moment</li> <li>● Automatic gain adjustment is not enough</li> </ul>	<ul style="list-style-type: none"> <li>● Measure again keeping enough distance so that the sensor does not attach to a belt</li> <li>● Turn off a power once at the measurement place, then turn it on (Turn on a power with connected the sensor, then push "MEASURE" button after one second</li> </ul>

\*Please inquire to us or the dealer where you purchased if the U-550 does not work after checking the points above.

# 3. Measurement principle of U-550

When we make a belt between pulleys vibrate by giving impact, it starts to oscillate irregularly as seen in Fig.1, but gradually it oscillates an inherent regular moves.

The U-550 tension meter was created to address this phenomenon. In the past, there was no easily implemented device which could catch these small waves. We succeeded in catching the period of wave pattern relatively easily by developing a data handling method to capture the vibration frequency that made full use of microcomputer.

As for the system, sensor detects the vibration waveform, microcomputer calculates the character vibration number by processing the data.

To calculate the belt tension, we use “the transverse vibration of the thread” for setting at a tension as right side.

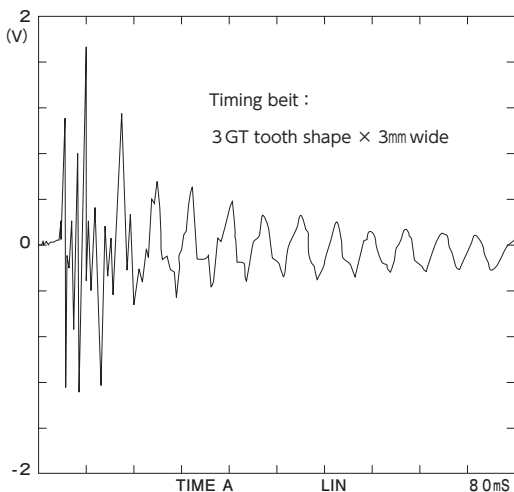


Fig.1 Oscillation attenuation of timing belt

Therefore, it is required to input the length of span to be measured and the mass of belt (unit mass x width) by use of numeric key.

## Calculation “ $T_o=4 \times M \times W \times S^2 \times f^2 \times 10^{-9}$ ”

- To: Tension (N)
- M: Unit mass (g/mm width × m length)
- W: Belt width or number of ribs(wires) (mm/R)
- S : Measured span length (mm)
- f : Horizontal characteristic frequency (Hz)

Here, the belt and the wire have a rigidity, which is different from the string, therefore U-550 measurement displayed is somewhat higher than the actual tension under the affected condition.

Therefore, it is possible to obtain correction factor by strict calibration test and incorporate it to the data input, thereby it can display more accurate tension.

An example of calibration result of U-550 measurement and actual tension is shown below:

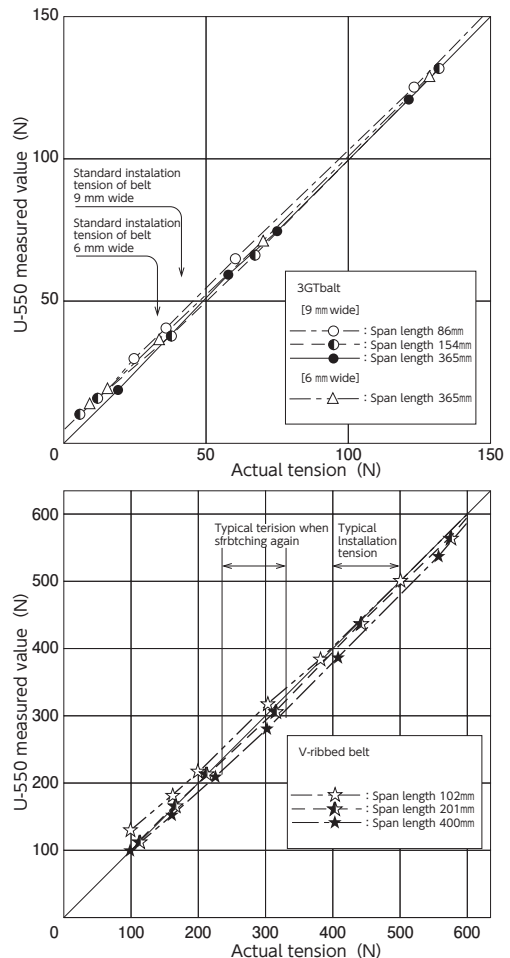
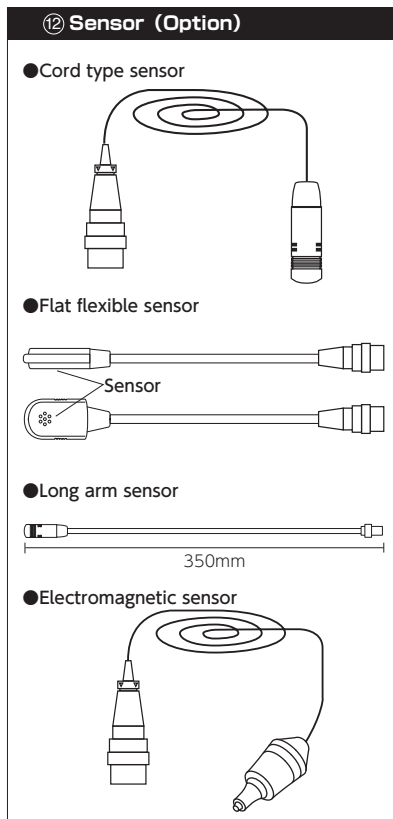
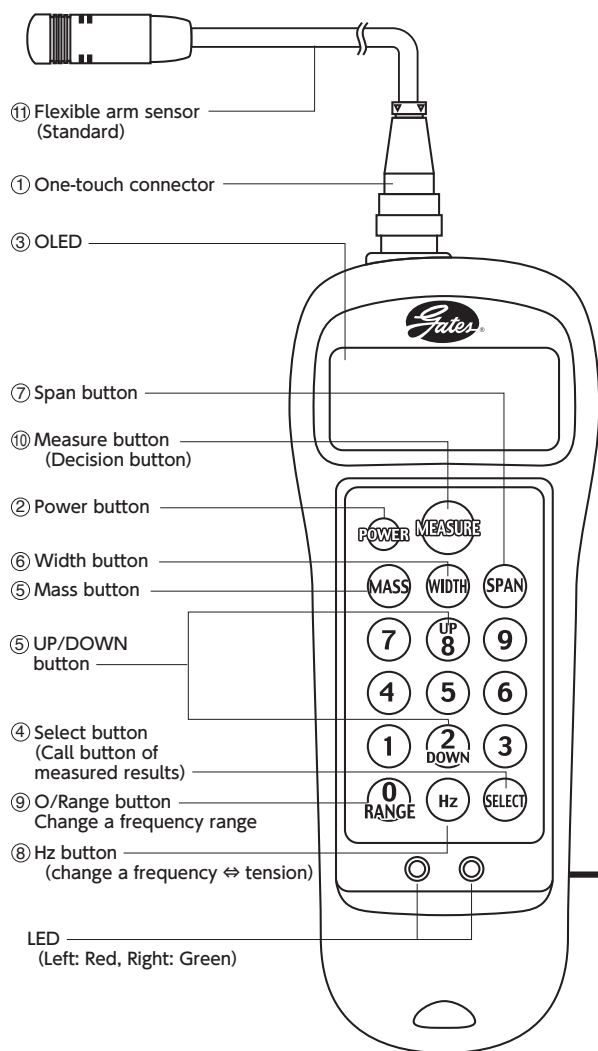


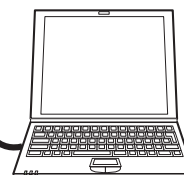
Fig.2 U-550 relation between measured value and actual tension

# 4. Explanation of the parts of U-550 main body

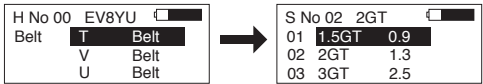
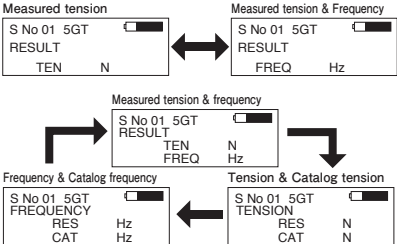
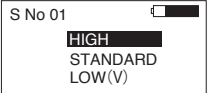




⑬ USB cable is not attached. Please use a commercial one. (Mini-B 5 type)

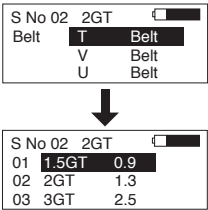
Power supply: Triple A type x 2 pieces






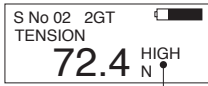
① One-touch connector	There is the hollow of a dent, insert a convex connector at the top. To remove a connector, slide the joint part and pull out.													
② Power button	Press the power button to turn U-550 on. It will automatically turn off five minutes after the last measure.													
③ OLED This displays tension value	<ul style="list-style-type: none"> <li>● Tension numerical number is shown by three digits from 0.01 ~ 99,900.</li> <li>● Frequency numerical number is shown by three digits from 10.0 ~ 5,000 Hz.</li> <li>● The red light and ERROR will be shown on the screen when the result of the measure is out of the standard range.</li> </ul> <p>NOTE: If the standard range over occurs after the result is shown, it beeps twice until the second measure.</p> <ul style="list-style-type: none"> <li>● A battery type signature at the time of the battery consumption is shown.</li> <li>● LOW BATT blinks on and off when the battery is low.</li> <li>● OLED will turn off after no operation for 1 minute.</li> </ul>	<p>[Overview of OLED showing pattern]</p> <p>Unit mass belt width span indication example</p> <table border="1"> <tr><td>S</td><td>No 00</td><td>█</td></tr> <tr><td>M</td><td>999.9 g/m</td><td>█</td></tr> <tr><td>W</td><td>999.9 mm/R</td><td>█</td></tr> <tr><td>S</td><td>9999 mm</td><td>█</td></tr> </table>	S	No 00	█	M	999.9 g/m	█	W	999.9 mm/R	█	S	9999 mm	█
S	No 00	█												
M	999.9 g/m	█												
W	999.9 mm/R	█												
S	9999 mm	█												

④ Select button	<ul style="list-style-type: none"> <li>● <b>[Memory of measuring condition]</b> Press SELECT button to choose any desired input number displayed in power-on. 40 memory functions selectable from No. 0 to 39 *To pass on, press SELECT button back to back, to jump in the number, press the wished number directly on it. Please press the number continuously to call out larger than the number ten.</li> <li>● <b>[Call out the measured result]</b> It is able to confirm the latest 500 data by pressing more than one second. To select the result, press UP or DOWM button. To jump the data, Press those button more than one second. *The result is recorded in order from Rec.001, it will be overwritten when the records stray the latest 500 results. *The result will be lost if the battery is removed for a long time.</li> </ul>																								
⑤ MASS button	<ul style="list-style-type: none"> <li>● <b>[To show the preinstalled mass]</b> Belt type category is shown up by pressing MASS button more than one second. And choose by UP or DOWN button and push MEASURE button for confirmation. *Showing unit : g/m. *CAT(rough standard), tension and frequency won't be shown without selecting belt type.</li> </ul>  <table border="1" data-bbox="326 575 806 658"> <tr> <td>H No 00</td> <td>EV8YU</td> <td><input type="checkbox"/></td> </tr> <tr> <td>Belt</td> <td>T Belt</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>V</td> <td>Belt</td> <td><input type="checkbox"/></td> </tr> <tr> <td>U</td> <td>Belt</td> <td><input type="checkbox"/></td> </tr> </table> <table border="1" data-bbox="600 575 806 658"> <tr> <td>S No 02</td> <td>2GT</td> <td><input type="checkbox"/></td> </tr> <tr> <td>01</td> <td>1.5GT</td> <td>0.9</td> </tr> <tr> <td>02</td> <td>2GT</td> <td>1.3</td> </tr> <tr> <td>03</td> <td>3GT</td> <td>2.5</td> </tr> </table>	H No 00	EV8YU	<input type="checkbox"/>	Belt	T Belt	<input checked="" type="checkbox"/>	V	Belt	<input type="checkbox"/>	U	Belt	<input type="checkbox"/>	S No 02	2GT	<input type="checkbox"/>	01	1.5GT	0.9	02	2GT	1.3	03	3GT	2.5
H No 00	EV8YU	<input type="checkbox"/>																							
Belt	T Belt	<input checked="" type="checkbox"/>																							
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S No 02	2GT	<input type="checkbox"/>																							
01	1.5GT	0.9																							
02	2GT	1.3																							
03	3GT	2.5																							
⑥ WIDTH button	<ul style="list-style-type: none"> <li>● Press WIDTH button for putting the width of the belt with numeric key. *Enter capacity: 000.1 - 999.9 mm/R *Enter the number of ribs for V belt.</li> </ul>																								
⑦ SPAN button	<ul style="list-style-type: none"> <li>● Press SPAN button for putting the width of the belt span numeric key.</li> </ul>																								
⑧ Hz button (switching frequency and tension)	<ul style="list-style-type: none"> <li>● Press Hz button for selecting frequency or tension. *The mode changes every time this button is pressed.</li> <li>● Press Hz button more than one second to show both records with tension and frequency.</li> </ul>  <p>Measured tension: S No 01 5GT RESULT TEN N</p> <p>Measured tension &amp; Frequency: S No 01 5GT RESULT FREQ Hz</p> <p>Measured tension &amp; frequency: S No 01 5GT RESULT TEN N Hz</p> <p>Frequency &amp; Catalog frequency: S No 01 5GT FREQUENCY RES Hz CAT Hz</p> <p>Tension &amp; Catalog tension: S No 01 5GT TENSION RES N CAT N</p>																								
⑨ 0/RANGE button (switch frequency range)	<p>Press 0/RANGE button more than one second to change measurement frequency range.</p> <table border="0" data-bbox="299 1097 1016 1174"> <tr> <td>HIGH.....900~5000Hz</td> <td rowspan="3">By UP or DOWN button to choose the range, and press MEASURE button for confirmation.</td> </tr> <tr> <td>STANDARD...10~1000Hz</td> </tr> <tr> <td>LOW(V).....10~50Hz</td> </tr> </table> <p>*Change to HIGH for measuring over 1000Hz</p>  <p>S No 01 HIGH STANDARD LOW(V)</p>	HIGH.....900~5000Hz	By UP or DOWN button to choose the range, and press MEASURE button for confirmation.	STANDARD...10~1000Hz	LOW(V).....10~50Hz																				
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STANDARD...10~1000Hz																									
LOW(V).....10~50Hz																									
⑩ MEASURE	<ol style="list-style-type: none"> <li>1.Press MEASURE button to set up auto trigger mode. *Initially  is shown. *During measurement  is shown. The measurement starts after receiving a signal from a sensor</li> <li>2.It will start measuring after selecting belt type and press MEASURE button.</li> <li>3.After changing measuring frequency range, press MEASURE button for measuring changed frequency range.</li> </ol>																								
⑪ Flexible sensor (Standard model)	<p>This sensor has narrow path of <math>\phi</math> 12.5mm and action-pipe which can set a sensor position handily. It is best used when one cannot put the main body on the floor.</p>																								
⑫ Sensor (Option)	<p>There are four kinds of sensors.</p> <ul style="list-style-type: none"> <li><b>Cord type</b> Because the size of this sensor is a narrow path of <math>\phi</math> 12.5mm, it is measurable by every places.</li> <li><b>Flat type</b> This is the free pipe of the flat shape with thickness 10mm and 20mm in width. Especially for the right angle direction in a particularly small place.</li> <li><b>Long arm type</b> By using this sensor, it is possible to measure that the main body is hard to reach.</li> <li><b>Electromagnetic type</b> This react to the electromagnetic vibration, unaffected by the neighboring noise, the measurement is possible under the vibration decrement early. However, an application such as the pasting of a thin magnetic film or the magnetic paint is necessary for a measurement side in the case of a rubber belt.</li> </ul>																								
⑬ USB cable for transfer	<p>This cable connects U-550 with PCs, and transfer the measured data.</p> <p style="text-align: right;">*USB cable in NOT included in the package. Please use the MINI-B 5 pin.</p>																								

# 5. Operation procedure of U-550

Procedure	Description	Operation	Display screen
1	Set up the sensor.	Choose an optimum sensor and fix in the main body with one-touch connector.	
2	Turn on power.	"POWER" button – PUSH	No <input type="checkbox"/>
3	Input No. by numerical keypad or select button. EX: Select from 00 to No.02	"SELECT" button – PUSH [Number is forwarded sequentially every time "SELECT" button is pressed. 00→01→...→38→39→00→01→02→In addition, you can jump to any designated number by pressing a number with numeric key. ] ① Selecting procedure "SELECT" button – PUSH (1st time) "SELECT" button – PUSH (2nd time) ② Selecting procedure "2" button – PUSH When "SELECT" button is pressed during the following procedure (during display of unit mass, belt width, span length input, and measured value), the number being chosen is displayed.	No <input type="checkbox"/>  No 00→No 01 No 01→ No 02  No 00→No 02
4-1	Case of inputting a unit mass manually. EX: Put 2.5g/mm wide x meter long [See page 9 for input data.]	"MASS" button – PUSH [Input the unit mass (g/mm W x m L) in the order of blinking position on display screen by use of numeric key. If you input wrong number, press "MASS" button again to return the cursor to the first.]  "0" button – PUSH "0" button – PUSH "2" button – PUSH "5" button – PUSH	M= <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> g/m [Allowable input capacity: 0.1~999.9g/mm×m]  M=0 <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> g/m M=00 <input type="text"/> <input type="text"/> g/m M=002. <input type="text"/> g/m M=002.5g/m
4-2	Case of inputting the unit mass from belt type. EX: Select 3GT.	● "MASS" button – PUSH (holding down more than one second) Belt category (T,V,U) is shown on screen by pressing "MASS" button n more than one second. By using "UP" or "DOWN" button to select the belt category. ● "MEASURE" button – PUSH Belt type is shown on screen, choose belt type by "UP" or "DOWN" button ● "DOWN" button – PUSH Place highlighted portion on 3GT. ● "MEASURE" – PUSH 3GT is displayed on screen.	 S No 02 2GT Belt T Belt V Belt U Belt  S No 02 2GT 01 1.5GT 0.9 02 2GT 1.3 03 3GT 2.5
5	Input the belt width. EX: Put 25.4mm. [See page 9 for input data.]	"WIDTH" button – PUSH [Do the same as described above. When data above allowable capacity is input, the cursor returns to the first, and input of data is requested again.] "0" button – PUSH "2" button – PUSH "5" button – PUSH "4" button – PUSH	W= <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> mm/R [Allowable input capacity: 000.1~999.9mm]  W=0 <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> mm/R W=02 <input type="text"/> <input type="text"/> mm/R W=025. <input type="text"/> mm/R W=025.4mm/R
6	Input the span length. [See page 9 for input data.]	"SPAN" button – PUSH [Do the same as described above.]	S= <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> mm [Allowable input capacity: 0001~9999mm]



7	Start measurement.	<p>①Get sensor in central span of the measure object without touching it.</p> <p>②"MEASURE" button – PUSH: LED (green) blinks, shows  .</p> <p>③To vibrate the wire, flip the belt span with a finger etc.: shows  .</p> <p>The following measurement is performed by the sensor receiving sound without use of measure button from the second time.</p> <p>Since measurement is started by the sensor receiving sound, it is started as well even by a noise if it has a relatively stable sound pressure. Result is shown as well as beep sound emitted and LED (green) turns on in 0.2 second after reception of belt vibration sound.</p>	 [After the second measurement, please notice that the screen shows the data previously measured. And you hear the beep, the new data will be displayed on the screen.]
8-1	Shows tension.	<p>"Hz" button – PUSH</p> <p>[Shows frequency corresponding to the measured tension.</p> <p>*When "Hz" button is pressed once again, the display returns to tension mode.]</p>	<p>*Indication example for upper lower limit are set</p> <p>However please match indication with tension indication (frequency indication) when you set the tension level (frequency). The upper lower limit setting with a PC.</p>
8-2	Shows frequency after measurement of tension.	<p>"Hz" button – PUSH</p> <p>[Shows frequency corresponding to the measured tension.</p> <p>When "Hz" button is pressed once again, the display returns to tension mode.]</p>	 <p>HIGH: Above the setting GOOD: Within setting range LOW: Below the setting</p>
9	Shows the result of measurement.	<p>To call the latest 500 records, press "SELECT" button more than a second on the SELECT screen.</p> <p>"SELECT" button – PUSH</p> <p>Shows measurement frequency, tension, unit mass at the measurement.</p> <p>Go back to the select screen.</p> <p>*To erase the measured data can be cleared collectively when it connects with PC.</p> <p>Individual deletion can be performed on the main unit.</p> <p>Method</p> <p>Push [6] button : Selection.</p> <p>Push [4] button : Deselection.</p> <p>Press [0] button more than a second : Delete.</p>	

\*Please check the U-550 application software manual for how to export the data to PC.

# 6. How to input the data

## 6-1. How to input the unit mass (Refer to the unit mass tables on next page)

- Tooth & Flat timing belt  
To input the unit mass is width(mm) × length(m) in g/mm width × mL.
  1. Data capacity is 000.1~999.9g/mm width × mL
  2. Able to input with four significant digit figures of three columns of integers and decimal one column
- Tooth & V belt from the pre-install data  
Push "MASS" bottom more than one second, belt type shows up on the screen. With using "UP" or "DOWN" button to select and push "MEASURE" to set.
- V, V-Ribbed belt and Wire  
Input the mass per meter of length in "g/m length" for unit mass.  
Able to input by four significant digits, i.e. three digits of integer and one digit below decimal point from 000.1 up to 999.9 g/m L. Unit mass corresponds to one piece for V-belt and wire, and one rib for V-ribbed belt.

	MASS	WIDTH	SPAN
Flat timing belt	g/mm W ×mL	mm	mm
V-Ribbed belt	g/Ribbed ×mL	Number of Ribbed	mm
V belt	g/one belt ×mL	1	mm
Wire	g/one belt ×mL	1	mm

Note: Unit mass of U-550,U-508,U-507, and U-505, U-305 is 10 times the input of conventional type U-303 since the input unit has been changed.

Therefore, when a value is input in conventional unit mass (g/cm<sup>2</sup>), measured tension is displayed in 1/10. (No change for the measured frequency on the screen)

## 6-2. How to input the belt width or the number of belts (ribs)

- Timing or Flat belt  
To put the date is for belt width is 000.1mm~999.9mm, three digits of integer and one digit below decimal point in mm.
- V, V ribbed belt, Wire  
For V belt and Wire, put one piece.  
For V ribbed belt, put the number of ribs of V-ribbed belt.

## 6-3. How to put the value of span length

Span length is a distance between contacts with pulley, and can be calculated by the following calculating formula.

Alternatively, measure the distance between pulley contacts with a tape measure and put.

$$S = \sqrt{C^2 - \frac{(Dp - dp)^2}{4}}$$

- S : Span length (mm)
- C : Distance between axes (mm)
- Dp: Large pulley pitch outer diameter (mm)
- dp : Small pulley pitch outer diameter (mm)

# 7. Unit mass table of the preinstalled belt

## Table1: Tooth and V belt list

Refer to the explanation of "MASS" button at page 5 and 6. As for the special pitch or the belt, please refer the unit mass table on the next page and input correctly.

Tooth shape belt (Standard construction)								V belt				Gates TPU belt (Long length urethane belt)			
Item	Unit mass	Item	Unit mass	Item	Unit mass	Item	Unit mass	Item	Unit mass	Item	Unit mass	Item	Unit mass	Item	Unit mass
1.5GT	0.9	8YU F	6.1	3M	2.4	MXL	1.2	3VX	59.8	D(V)	534.6	XL-K	1.9	T10-S	4.3
2GT	1.3	EV8YU	5.1	D3M	2.3	XL	2.1	5VX	165.6	E(V)	734.4	L-K	3.0	AT10	5.6
3GT	2.5	EV8YUC	4.8	5M	3.8	DXL	1.9	8VX	525.6	3VXPB	75.7	H-K	3.2	AT20	9.9
D3GT	2.5	EV8YU2	5.1	D5M	4.2	L	3.1	J(V)	8.6	5VXPB	210.9	T5-K	2.0	5M-S	4.1
5GT	4.0	D8YU	5.4	8M	6.1	DL	3.3	PK(V)	20.0	5MPF	10.5	T10-K	3.6	8M-S	5.9
EV5GT	4.0	8MGT	4.7	D8M	6.3	H	3.8	L(V)	30.4	7MPF	25.7	XL-S	2.1	14M-S	10.7
EV5GTC	3.8	14MGT	8.0	14M	10.0	DH	4.4	A(V)	103.2	11MRF	52.1	L-S	3.5	8YU-S	5.2
D5GT	4.3	EV14M	8.7	D14M	11.9	XH	11.1	B(V)	166.0	(E)PJ	7.5	H-S	3.9		
8YU	5.2	EV14M2	8.3	20M	12.8	XXH	14.8	C(V)	298.8			T5-S	2.2		

NOTE

Item	BELT TYPE	Item	BELT TYPE	Item	BELT TYPE	Item	BELT TYPE	Item	BELT TYPE
EV5GTC	EV5GT Carbon	8MGT	Polychain8MGT	5VXPB	5VX Powered band	*-K	Aramid (Kevlar) cord		
8YU F	8YU Fluorine	14MGT	Polychain14MGT	5MPF	Polyflex5M		Gates TPU belt		
EV8YUC	EV8YU Carbon	EV14M2	EV II 14M	7MPF	Polyflex7M	*-S	Steel cord		
EV8YU2	EV II 8YU	3VXPB	3VX Powered band	11MPF	Polyflex11M		Gates TPU belt		

(unit:g/mm width x m length)      unit mass: Mass per meter length of one rib(g/m length)      (unit:g/mm width x m length)

# 8. Unit mass table of Gate Unitta Asia tooth shape timing belt

## Table2: For U-550,508, 507 and U-505, 305 unit mass table

Data of unit mass can be input by four significant digits, i.e. three digits of integer and one digit below decimal point in g/mm W x m L from 0.1 to 999.9 g/mm W x m L.

### List of timing belt unit mass

#### ① Timing belt

Tooth shape	MXL	XXL (50)	XL	DXL	L	DL	H	DH	XH	XXH
Pitch (mm)	2.032	3.175	5.080	5.080	9.525	9.525	12.700	12.700	22.225	31.750
Unit mass (g/mm width x m length)	1.2	1.4	2.1	1.9	3.1	3.3	3.8	4.4	11.1	14.8

#### ② HTD belt

Tooth shape	3M-HTD	D3M-HTD	5M-HTD	D5M-HTD	8M-HTD	D8M-HTD	EV14M	EV14M2	14M-HTD	D14M-HTD	20M-HTD
Pitch (mm)	3.000	3.000	5.000	5.000	8.000	8.000	14.000	14.000	14.000	14.000	20.000
Unit mass (g/mm width x m length)	2.4	2.3	3.8	4.2	6.1	6.3	8.7	8.3	10.0	11.9	12.8

#### ③ GT belt

Tooth shape	1.5GT	2GT	3GT	D3GT	5GT	D5GT	EV5GT	EV5GTC	8YU	8YUF	D8YU	EV8YU	EV8YU2	EV8YUC
Pitch (mm)	1.500	2.000	3.000	3.000	5.000	5.000	5.000	5.000	8.000	8.000	8.000	8.000	8.000	8.000
Unit mass (g/mm width x m length)	0.9	1.3	2.5	2.5	4.0	4.3	4.0	3.8	5.2	6.1	5.4	5.1		4.8

#### ④ Polychain GT carbon belt

Tooth shape	8M-GT	14M-GT
Pitch (mm)	8.000	14.000
Unit mass (g/mm width x m length)	4.7	8.0

#### ⑤ Gates TPU belt

Tooth shape	XL	L	H	T5	T10	WT10	AT5	AT10	AT20	5M	8M	14M	8YU	
Pitch (mm)	5.080	9.525	12.700	5.000	10.000	10.000	5.000	10.000	20.000	5.000	8.000	14.000	8.000	
Steel	E/C *	2.1	3.5	3.9	2.2	4.3	-	3.5	5.6	9.9	4.1	5.9	10.7	5.2
	F *	-	-	-	2.2	4.0	-	3.5	5.7	-	-	-	-	-
Aramid	1.9	3.0	3.2	2.0	3.6	3.9	-	-	-	-	-	-	-	-

\*E : Endless C : Open end F : Flex

#### ⑥ Special pitch belt

Tooth shape	101	102	103	104	111	109	181	25	9109
Pitch (mm)	1.5875	2.0320	2.1167	2.8222	1.4111	2.1167	2.8222	6.3500	15.4473
Unit mass (g/mm width x m length)	1.0	1.3	1.3	1.0	1.1	1.1	0.9	1.7	3.0

Note: Input with a value 10 times as large as a unit mass listed (g/cm) used in U-303 (out of sales model).

# 9. The unit mass table of V belt made by Gates

## ■ Table 3: Specialized unit mass table for U-550,508, 507, 505, 503

The V belt has high comparative rigidity, the gap of revision is necessary for the actual and measured tension value in the range of the standard installation tension. Therefore, it should be adopted as WEIGHT level which is calculated by the following;

$$[M \text{ (g/m length)} = \text{Mass per meter length of one rib (g/m length)} \times \text{Tension correction factor}]$$

### ① Super HC type

Input item	3VX Single	3VX Power band	5VX Single	5VX Power band	8V Single
WEIGHT (Mass x compensation) coefficient per 1 rib 1m length	$68.0 \times 0.88 = 59.8$	$87.0 \times 0.87 = 75.7$	$182.0 \times 0.91 = 165.6$	$237.0 \times 0.89 = 210.9$	$657.0 \times 0.8 = 525.6$

### ② Polyflex type

Input item	5M	7M	11M
WEIGHT (Mass x compensation) coefficient per 1 rib 1m length	$11.0 \times 0.95 = 10.5$	$27.0 \times 0.95 = 25.7$	$56.0 \times 0.93 = 52.1$

### ③ Micro V type

Input item	J section	PK section	L section
WEIGHT (Mass x compensation) coefficient per 1 rib 1m length	$9.0 \times 0.95 = 8.6$	$21.0 \times 0.95 = 20.0$	$32.0 \times 0.95 = 30.4$

### ④ Standard V type

Input item	A	B	C	D	E
WEIGHT (Mass x compensation) coefficient per 1 rib 1m length	$120.0 \times 0.86 = 103.2$	$200.0 \times 0.83 = 166.0$	$360.0 \times 0.83 = 298.8$	$660.0 \times 0.81 = 534.6$	$1020.0 \times 0.72 = 734.4$

\*Contact us for unit mass of toothed belt for automobile engine and V-ribbed belt for driving automobile engine auxiliary equipment.

Note: Inquire to us for the unit mass of V-ribbed belt and tooth belt for automobile engines with and automobile engine supplementary plane drive.

# 10. The standard installation tension table of the GUA timing belt

## ① Timing Belt

Tooth Shape	Width (mm)													Unit (N)	
	3.2	4.8	6.4	7.9	9.5	12.7	19.1	25.4	38.1	50.8	76.2	101.6	127.0		
			(025)	(031)	(037)	(050)	(075)	(100)	(150)	(200)	(300)	(400)	(500)		
MXL	2.9	5.1	7.6	10.3	11.8										
XL			13.7	19.6	24.5										
L						52.0	87.3	123.0							
H							222	312	486	668	1050				
XH										909	1430	2020			
XXH										1120	1750	2480	3210		

## ② GT&HTD Belt

Tooth Shape	Width (mm)																			Unit (N)				
	1.5	2.0	2.5	3.0	4.0	6.0	9.0	12	15	20	25	30	40	50	55	60	70	85	100	115	130	150	170	
1.5GT	2.3	3.4	4.4	5.6	7.8																			
2GT		4.3	5.2	6.4	9.4	15.8	25.2	34.6	44.1															
3GT-3M					20	29	44	59	74	98														
5GT-5M							55		96	137	178	220	302											
EV5GT							71	98	125	178	232	286	393											
8YU-8M										235	294	343	500	637		765	892	1100						
EV8YU									210	280	350	410	600	760		920	1100	1300						
14M											441	618	775	902		1190	1470		2090				3190	
EV14M											560	740		1100	1200	1400	1800	2100	2500	2900	3400	3800		

\*Contact us about 20M type.

## ③ Polychain GT Carbon Belt

Tooth Shape	Width (mm)	Unit (N)													
		12	15	20	21	25	30	36	40	50	60	62	70	80	
8MGT	MIN	190	240	320	340	400	480	580	640	800	970	1000	1130	1290	
	MAX	260	330	430	460	540	650	780	870	1080	1300	1340	1520	1730	
14MGT	MIN	820	1230	1520	1640	2050	2460	2790	2870	3280	3690	4100	4720	5130	5330
	MAX	1100	1670	2050	2220	2780	3330	3770	3890	4440	5000	5550	6380	6940	7220

## ④ Gates TPU Belt

Tooth Shape	Width (mm)	Unit (N)											
		10	15	20	25	30	40	50	55	60	80	85	100
T5	20	29	39	49	59		98						196
T10		129	173	216	259		431						863
AT5	60	99	137	178	220		376						773
AT10		183	235	294	343		637						1301
AT20							775						1792
5M	60		137		220		376						
8M			235		343		637						1301
14M						618		902			1470	1792	
8YU			235	294	343	500	637		765	1020			1275

Tooth Shape	Width (mm)	Unit (N)				
		(050)	(075)	(100)	(200)	(400)
XL	25	37	49	97	193	
L	44	67	88	177	353	
H	-	162	216	431	863	

About the installation tension level of our tooth belt, the gap will not occur between U-550 measurement and true tension in the range of Note1 and Note3. So it is not necessary to set a tension compensating rate.

Note1) As for the measuring installation tension, set the belt on the machine first and measure the average tension of stretch and loose side of the belt after spinning several times to make the machine run smoothly. If both spans have the difference of more than 30%, please adjust them and measure again.

Note2) Measure with a span having the length more than 20 times the tooth pitch.

(Because a higher value than actual is showed at the short range to be affected by the rigidity of the belt itself.)

Note3) Set the tension range more than 1/3 of standard installation tension.

(Because a higher value than actual is showed at the low tension to be affected by rigidity of belt itself.)

Also by the measuring method of our tension meter, measurement in an extremely low tension range is sometimes impossible.

Note4) As for the special belt like a wide and back-ribbed belt on its back for conveying, the gap between the true tension value is presumed, so that simple calibration is required for checking tension which needs comparative precision.

As for experienced machines install the belt following the procedure provided for a corresponding machine, it is capable of managing tension by setting cycle numerical value which approved by U-550 afterward.

# 11. Specification of U-550

## ■ Main Body

- Power Supply: Two triple A batteries. Alkaline battery is recommended.
- Overall Size: 160(H) × 59(W) × 26(26)
- Mass: 120g
- Temperature and humidity range for use and storage: -10~-50°C, 80% (free from condensation)

## ■ Accessories

### ● U-550

- 1) Flexible type sensor
    - Sensor outer diameter: 12.5mm
    - Total length: 170mm
    - Measurable frequency band: 10Hz~5000Hz
  - 2) Soft case for carrying
    - Capable of containing the body of tension meter, flexible type sensor etc.
    - Total length: 170mm
    - Measurable frequency band: 10Hz~5000Hz
  - 3) Two triple A batteries
  - 4) Operation manual of U-550
  - 5) Operating procedure sheet for carrying
  - 6) Inspection acceptance certificate
  - 7) Warranty
  - 8) Two USB connecting caps (one is for a spare)
  - 9) Operating manual of application software for U-550
- \*Please use the MINI-B 5 as USB connector

### ● Option

- 1) Flat flexible sensor
  - Sensor outer diameter: Thickness 10mm, Width 20mm
  - Total length: 170mm
  - Measurable frequency band: 10Hz~5000Hz
- 2) Long arm sensor
  - Sensor outer diameter: 12.5mm
  - Total length: 350mm
  - Measurable frequency band: 10Hz~5000Hz
- 3) Electromagnetic sensor
  - Total length: 1m
  - Measurable frequency band: 10Hz~5000Hz
- 4) Cord type sensor
  - Sensor outer diameter: 12.5mm
  - Total length: 1m
  - Measurable frequency band: 10Hz~5000Hz

# 12. Guarantee & Repair Guidelines

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Thank you for choosing our sonic tension meter (U-550).

We guarantee for one year for the main body and six months for the sensor.

If our sonic tension meter (U-508) fails due to a manufacturing or workmanship defect during the period, we repair it free of charge.

Please contact our distributor from which you purchased for the repair. (See the enclosed warranty.)

When the official approval is required, direct the sensor to a communicator which emits stable frequency sound from 10 to 5000 Hz, and measure the same way as measuring tension. The calibration is enabled easily.

Tension meter official approval device (U-305-OS1) is also in the market.

If needed, please contact our sales department for paid official approval.

# **GATES UNITTA ASIA COMPANY**

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