

**Option sensor** (Capable of using for U-507, U-505, and U-303)

**Flat flexible sensor**  
(TM-YOKO)

RoHS certified equipment



This comes in the free form of the flat shape with thickness 10mm and 20mm in width. Especially suitable for finding the right angle direction in a particularly small place.  
(Total length is 170mm)

**Long arm sensor**  
(TM-LONG1)

Not RoHS certified equipment



Entire arm length is 350mm. By using this sensor, it is possible to measure when the main body is hard to reach.  
(Sensor  $\phi$ : 12.5mm)

**Cord type sensor**  
(TM-COM)

RoHS certified equipment



Because the size of this sensor is a narrow path of  $\phi$  12.5mm, it is measurable by every place.  
(Entire arm length is 1m)

**Electromagnetic sensor**  
(TM-DGS)

RoHS certified equipment



This reacts to the electromagnetic vibration, unaffected by the background 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.  
(Entire arm length is 1m)

(Common specification / Measurable frequency range: 10Hz~5,000Hz)

**Option**

● Calibration device (TM-OS1) **RoHS certified equipment**

For U-508, U-507, U-505, U-305 series 25, 90, 500, 2K, 4KHz, total 5 kinds of vibration (signal wave) are able to be transmitted.



| Feature   | Dispatch frequency                                   | Frequency range  | Output power waviness | Distortion rate                         | Output voltage |
|---|--|------------------|-----------------------|---|----------------|
| Special device for certifying the frequency of sonic wave tension meter (Oscillation transmitter) | 25Hz,90Hz, 500Hz,2kHz 4kHz                           | Less than 0.1%   | Sign wave             | With in 1%                              | 20mV (P-P)     |
| Consumption current   | Power source   | Overall size     | Mass                  | Usage environment                       |                |
| 50mA (At the time of output)<br>Under 10mA (Not at the time of output)                            | Size AA battery x 4 pieces<br>AC adaptor (DC6V 50mA) | W155xH46 xD134mm | 300g                  | Less than -10~50°C<br>80% (Non dewfall) |                |

■ Safety precautions

- Please read & follow these precautions carefully.
- Please measure the tensile force after confirming that the machine has been turned off.
- Do not use for the purpose other than measuring tension.
- Do not put liquid such as water or solvents on the meter. Please handle with adequate care.

# Sonic Belt Tension Meter U-508

CAT.513-1

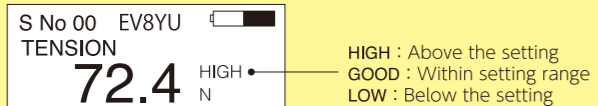


# FEATURES OF U-508

**New** The 500 latest results are retained for record keeping.

**New** Exporting the results to PC is possible. (Note: Operate only Japanese Microsoft Windows Vista/7/8)

**New** Judgment functions of the result. Utilizing the equipped application U-508 for PC, before hand, you can set up both upper and lower limit; therefore you can easily find out the result.



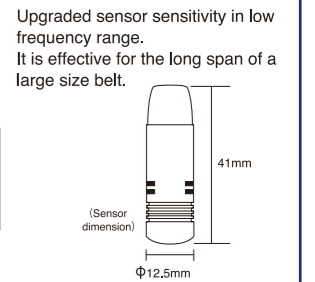
## Basic Function

**Preinstalled belt unit mass is expanded** **High quality sensor**

Can display the unit mass by selecting the belt type. Former type U-507: 46 kinds → U-508: 69 kinds

|         |       |     |
|---------|-------|-----|
| S No 01 | 1.5GT | 0.9 |
| 1       | 2GT   | 1.3 |
| 2       | 3GT   | 2.5 |

52 kinds of tooth belt and 17 kinds of V belt data are already installed.



**Wider measurable frequency area**

The number of switching range: U-507 3 steps → U-508 2 steps  
Capable of measuring up to 5000Hz.

**Data selecting function options are enriched.**

Doubled the amount of available numbers to memorize the input data.

Former type U-507: 20 kinds → U-508: 40 kinds

**Equipped graphic LCD**

The graphic LCD is capable of displaying enormous volume of information.

**Display measured tension value and frequency value**

|         |        |     |      |    |
|---------|--------|-----|------|----|
| S No 01 | RESULT | TEN | 28.1 | N  |
|         |        | FRQ | 249  | Hz |

Capable of confirming tension and frequency value at once.

**Traceability system**

Inspection result of ISO9000, traceability certification and calibrator are available.

**Other functions**

- Automatic cancellation of background noise by automatic gain adjustment
- Automatic trigger off function
- Automatic power off
- Graphic LED with backlight

**Backlight equipped**

Convenient to use in dark area by LCD backlight

**Display Measured and standard tension (rough indication)**

|         |     |        |     |      |   |
|---------|-----|--------|-----|------|---|
| S No 01 | 3GT | RESULT | RES | 31.5 | N |
|         |     |        | CAT | 29.0 | N |

Capable of comparing measured and standard tension value. (Tooth belt only)

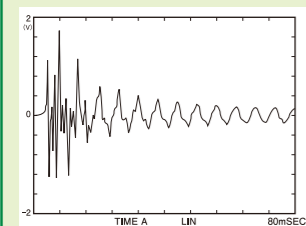
**Display mass, width and span**

|         |   |       |      |
|---------|---|-------|------|
| S No 01 | M | 999.9 | g/m  |
|         | W | 999.9 | mm/R |
|         | S | 9999  | mm   |

Input data is viewable.

## Measurement principle of U-508

When we make a belt between pulleys vibrate by giving impact, it starts to oscillate irregularly, but gradually it oscillates inherent regular moves. 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. It can measure tension value more accurate than calculation formula in the program. Patent: No.1931781



### Measurement Step

- Gain adjustment (Automatic canceling of background noise)**  
This unit measures the surrounding noise environment periodically after power-on until pressing of "MEASURE" button, and automatically adjusts the sensitivity of sensor. Press "MEASURE" button of fixing the sensitivity of sensor.
- Detection of vibration waveform**  
The sensor detects sonic wave which was generated by flipping the static belt with a finger.
- Removal of noise component**  
Self-contained filter automatically removes noise component.
- Measurement of cycle**  
Cycle measurement circuit measures every cycle of input waveform.
- Signal processing**  
Measures basic waveform by oscillation pattern which differs from condition to condition by data processing established in simulation.
- Frequency conversion process**  
Converts continuous stable waveform into frequency.
- Tension calculation process**  
The unit converts belt tension when unit weight, width, and span length of corresponding belt are input with numeric key.

$$\text{Calculation : } T_o = "4 \times M \times W \times S^2 \times f^2 \times 10^{-9}"$$

T<sub>o</sub> : Tension  
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)

## Calculation example

**[1] Tooth belt** [8YU × 20mm, Span length 250mm]  
• Input value: M=5.2 (g/mm width × m length)  
W=20 (mm width), S=250 (mm span length)  
• About Tension (N) and frequency (Hz)  
2.6N/10Hz~9,360N/600Hz

**[2] V rib belt** [MicroV / PK section×5rib, Span length 250mm]  
• Input value: M=21.0 (g/mm width × m length)  
W=5.0 (Number of Ribs), S=250 (mm span length)  
• About Tension (N) and frequency (Hz)  
2.63N/10Hz~9,450N/600Hz

**[3] Steel wire** [φ0.6mm Steel wire, Span length 50mm]  
• Input value: M=1.3 (g/mm width × m length)  
W=1.0 (Put 1 for each), S=50 (mm span length)  
• About Tension (N) and frequency (Hz)  
0N/10Hz~325N/5,000Hz

## Sonic Belt Tension Meter U-508

|                  |   |
|------------------|---|
| Model name       | U-508   |
| Model number     | TM-508  |
| Measurable range | 10Hz~5,000Hz  |
| Battery          | Alkaline battery (Triple A type × 2 pieces)   |
| Mass             | 120g  |
| RoHS             | Certified   |
| Accessories      | Flexible type sensor (TM-AMM)<br>Soft case for carrying<br>Two triple A batteries<br>USB cable is not attached. |