

T-ACE Instruction Manual

Thank you for your selection of Tsubaki Belt Tension Meter T-ACE.

For Safe Use

- I Do not wet the product with water or oil nor give shock to it such as by dropping it. The product may fail.
- I Do not disassemble or modify the product. Such a practice may cause fire or electric shock.
- I Do not keep the product in places that are humid, hot or filled with dust.
- I When the product will not be used, remove the battery and keep the product in the case.
- I Do not bend the sensor microphone. To pull it out, hold the connector. Otherwise the product may fail.

 **Danger** Do not use the product when the belt is running. Otherwise, your hand may get caught.
(Measurement is possible only when the belt is at a stop.)

List of Unit Mass

● PX tooth profile			Unit: kg/m		
Type	Width (mm)	MASS	Type	Width (mm)	MASS
P2M	4	0.006	UP14M	40	0.304
	6	0.008		60	0.456
	10	0.014		80	0.608
P3M UP3M	6	0.013		100	0.760
	10	0.022		120	0.912
	15	0.034	DP3M	6	0.015
P5M UP5M	10	0.041		10	0.025
	15	0.062		15	0.038
	25	0.103	DP5M	10	0.038
P8M	15	0.084		15	0.058
	25	0.139		25	0.096
	40	0.223	DP8M	15	0.088
P14M	60	0.334		25	0.148
	40	0.393		40	0.237
	60	0.589		60	0.355
	80	0.786	DP14M	40	0.417
UP8M	100	0.982		60	0.626
	120	1.178		80	0.835
				100	1.043
				120	1.252

● Trapezoidal tooth profile				Unit: kg/m			
Type	Nominal Width	Width (mm)	MASS	Type	Nominal Width	Width (mm)	MASS
MXL	3.2	3.2	0.004	XXH	200	50.8	0.818
	4.8	4.8	0.006		300	76.2	1.227
	6.4	6.4	0.008		400	101.6	1.636
	9.5	9.5	0.012		500	127.0	2.045
	12.7	12.7	0.016	XL	025	6.4	0.017
XL	025	6.4	0.017		031	7.9	0.021
	031	7.9	0.021		037	9.5	0.026
	037	9.5	0.026		050	12.7	0.035
	050	12.7	0.035	DL	025	6.4	0.012
L	050	12.7	0.048		031	7.9	0.015
	075	19.1	0.073		037	9.5	0.018
	100	25.4	0.097		050	12.7	0.042
H	075	19.1	0.101	DH	075	19.1	0.062
	100	25.4	0.135		100	25.4	0.083
	150	38.1	0.202		100	25.4	0.112
	200	50.8	0.269		150	38.1	0.169
	300	76.2	0.404		200	50.8	0.225
XH	200	50.8	0.635		300	76.2	0.337
	300	76.2	0.953				
	400	101.6	1.270				

● Urethane				Unit: kg/m					
Type	Nominal Width	Width (mm)	MASS	Type	Width (mm)	MASS	Type	Width (mm)	MASS
MXL	3.2	3.2	0.005	T2.5	3	0.005	AT5	10	0.038
	4.8	4.8	0.007		5	0.008		15	0.057
	6.4	6.4	0.009		7	0.011		25	0.095
					10	0.015		50	0.190
XL	025	6.4	0.015	T5	5	0.016	AT10	25	0.170
	031	7.9	0.019		10	0.032		50	0.340
	037	9.5	0.023		15	0.048		75	0.510
	050	12.7	0.034		20	0.064	AT20	50	0.550
	075	19.1	0.052		25	0.080		75	0.825
	100	25.4	0.068						
L	037	9.5	0.036	T10	15	0.075	DT5	5	0.012
	050	12.7	0.046		20	0.100		10	0.024
	075	19.1	0.069		25	0.125		15	0.036
	100	25.4	0.091		50	0.250		20	0.047
	150	38.1	0.146		75	0.375			
	200	50.8	0.194						
H	050	12.7	0.068	T20	25	0.180	DT10	15	0.079
	075	19.1	0.096		50	0.360		20	0.106
	100	25.4	0.127		75	0.540		25	0.132
	150	38.1	0.191						
	200	50.8	0.254						
	300	76.2	0.380						
	400	101.6	0.538						

Basic formula

Tsubaki Belt Tension Meter T-ACE calculates the tension using the following formula:

• Frequency

$$F = \frac{1}{2L} \sqrt{\frac{T}{W}}$$

• Span length

$$L = \sqrt{C^2 - \frac{(D_p - d_p)^2}{4}}$$

• Belt tension

$$T = 4 \times W \times L^2 \times F^2$$

F: Frequency

T: Belt tension

L: Span length

W: Belt unit mass

D_p: Large pulley pitch diameter

d_p: Small pulley pitch diameter

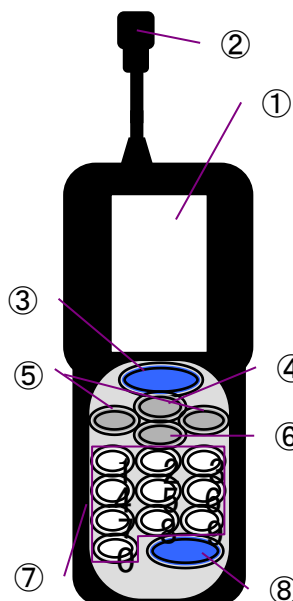
c: Distance between shafts

Specifications

Model	BDTM101
Measuring range	0.1~9999N , 30~600Hz
Belt span length	0.001~9.999m
Unit mass	0.001~9.999kg/m
Working temperature	-10~60°C
Power supply	Dry cell (AAA) x 4 pieces
Mass and dimensions	160 g (main unit) 162 long x 61.6 wide x 30 thick in mm
Accessories	Sensor microphone, dry cells (AAA x 4 pieces), carrying case

※ Even if the mounting tension is adequate, the vibration frequency may be out of the measurable range of the product depending on a combination of measuring conditions used.
(A particular attention is required when the span length exceeds 1 m.)

【Description of the Function



① LCD screen	1) Battery... Lights up when the cells need to be replaced. 2) Measurement result... Shows the measurement result converted to belt tension. 3) Unit... Shows the measurement result unit in N or Hz. 4) SPAN/MASS... Shows measuring conditions. Flashes during condition setting. 5) Memory... Shows the applicable MEM no. (no. 01~10) 6) [S] mark... Lights up during measurement.
② Sensor microphone	Catches sound waves of the belt.
③ START button	When this is pressed to start measurement, the [S] mark will appear on the LCD screen. Then bring the microphone close to the belt and flip it with fingers to take measurement.
④ N/Hz select button	Changes over measurement results between N and Hz display.
⑤ SPAN/MASS buttons	When these buttons are pressed, the meter enters the measuring condition input mode and the display flashes. - SPAN ... Belt span length (m) - MASS ... Belt unit mass (kg/m) Using the ten-key pad, enter a numeric value and press the button again. Then the value is accepted.
⑥ MEM (Memory) Button	Use this button to store measuring conditions or call stored conditions.
⑦ Ten-key Button	Use this pad to enter measuring conditions.
⑧ ON/OFF Button	Press this button to turn on/off the power. If the meter is not operated at all for three minutes, the power is turned off automatically.

【Operating Procedure】

Procedure	Display Status
1. Power on the meter. - Hold the ON/OFF button pressed for one second or longer. Cautions) <u>The initial display is as follows: measurement result = 0, unit = Hz and MEM no. = blank. When the meter is used the second time and thereafter, the previous conditions and measurement results are shown.</u> 2. Enter measuring conditions. Exa.) SPAN 0. 325m MASS 0. 139kg/m - Press the SPAN button for about one second. The SPAN display part flashes and the meter is ready for entry of a numeric value. The initial value is "0.100". (Display status①) - Using the ten-key pad, enter a numeric value. The decimal point is fixed and needs not be entered. Figures are entered from the left side place. If you entered a wrong figure, enter all places once, and then re-enter correct figures starting with the left place. - After having entered a numeric value, press the SPAN button again for about one second. The value is stored. The display changes from flashing to lit status. (You will hear a sound "pi".) - Enter a value to MASS similarly. (For the belt unit mass, see the List of Unit Mass.) - Up to 10 measuring conditions can be stored in memory. After entering a condition to store, press the MEM button for one second or longer. Then the memory display part flashes. Then each time the button is pressed quickly, the display changes as MEM no.01 => 02 => ... Select a number to store and press the MEM button again for one second or longer. Then the condition is stored. (Display status②) 3. Start measurement. - Select a unit to show measurement results by pressing the N/Hz button. - After pressing the START button, bring the microphone close to the belt and flip the belt with fingers and take measurement. When the measurement has been completed, you will hear a sound "pi" and the measurement result is shown. (Display status③) - While the mark [S] is being shown, measurement can be repeated as many times as necessary. - To use the conditions stored in memory, press the MEM button quickly and select the MEM no. to use. Then the stored conditions are shown in SPAN and MASS. 4. End. - To end the measurement, hold the ON/OFF button pressed for two seconds or longer. If the meter is not operated at all for three minutes, the power is automatically turned off. Cautions) <u>The following are operation errors and a sound "pi" will be issued:</u> <u>A button other than those on the ten-key pad is pressed in the input mode.</u> <u>When a numeric value of SPAN and MASS is flashing (meaning the input mode), the operation of buttons other than those on the ten-key pad is not accepted (except for the ON/OFF button). Operate them after ending the input mode.</u> <u>A value "0.000" is entered to SPAN and MASS.</u> <u>If SPAN and MASS are set to "0.000", the input mode cannot be ended.</u> <u>The ten-key pad is operated in modes other than the SPAN and MASS input mode (flashing).</u>	① 0 Hz SPAN 0. 100 (m) MASS 0. 100 (kg/m) ② 0 Hz SPAN 0. 325 (m) MASS 0. 139 (kg/m) ③ 150 N [S] SPAN 0. 325 (m) MASS 0. 139 (kg/m)