Hand Held Type Digital Tension Meter
High Function Type (with output)

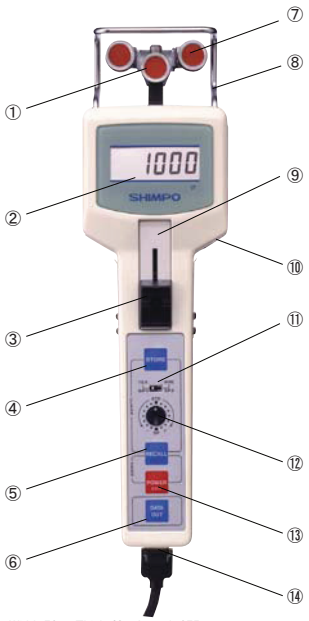
DTMX- □ C Series

General Purpose Type (without Output)

DTMB- □ C Series

Corresponds to High Level Measurement Environment

(1) SENSING ROLLER
(2) LCD DISPLAY EQUIPMENT
Maximum. Minimum Value, PEAK Value, Lights up whenever all indications battery low.
(3) SLIDE-KNOB FOR GUIDE ROLLER
Use when the measuring wire is pinched. (In place of Slido-knob for guide roller, supporting lever can be installed.
(4) STORE SWITCH
Use at data memory.
(5) RECALL SWITCH
Used when Maximum. Minimum Value Memory Data is to be recalled.
(6) MEMORY DATA OUTPUT SWITCH
Data Output – when PC or Printer is connected.
(7) GUIDE ROLLER
(8) WIRE GUIDE
(9) DIP SWITCH COVER (DIP SWITCH)
Memory Mode, Display Time, Data Output, Wire Type Set.
(10) CONNECTOR FOR AC ADAPTER
Connect the optional adapter.
(11) WIRE TYPE SWITCHING SWITCH
Matching with the Wire Type, Select TEX (Thread), or WIRE (Steal,Copper).
(12) FIELD ADJUSTMENT SWITCH
When indication value is increased it executes correction.
(13) POWER SUPPLY SWITCH
Performs power supply ON/OFF.
(14) CONNECTOR FOR OUTPUT



Width 76 x Thick 48 x Length 275mm
The photograph is of DTMX- □ C Series

＊Note : 1cN=1.0197 gf=0.01N
1daN=10N1.02kgf(1kgf9.8N=0.98daN)

Corresponding with recording or statistical process, high level measurement environment hand belt model controlled through the PC control – the Digital Tension Meter.

- Through RS-232C, digimatic output, analog output, controlling is possible for PC printer measurement values. (DTMX- □ C Series)
- Up to 100 items measured data could be memorized. Further, proper printer connection, Max. Min. Value. Average Values etc. – automatic statistical processing is possible.
- At 1 machine, max. 5 types of wire varieties could be measured. (Thread steal wire and copper wire. Other than this, 2 types sample wires)
- Realization of ± 1% R.C. High Accuracy. (DTMX-0.2C, 0.5C/DTMB-0.2C, 0.5C)
- Application of strong aluminum case against shock or static electricity.

Calibration as per customer 's specified special wire calibration could also be coped-up.

Model	Maximum Load	
DTMX-0.2C	196.1cN	200.0g
DTMB-0.2C		
DTMX-0.5C	490.3cN	500.0g
DTMB-0.5C		
DTMX-1C	981cN	1000g
DTMB-1C		
DTMX-2C	1961cN	2000g
DTMB-2C		
DTMX-2.5C	2452cN	2500g
DTMB-2.5C		
DTMX-5C	4903cN	5000g
DTMB-5C		
DTMX-10C	9.81daN	10.00kg
DTMB-10C		
DTMX-20C	19.61daN	20.00kg
DTMB-20C		

Measurement Items : Optical Fiber, Carbon Fiber, Magnetic Tape, Food Stuffs Film, Steal Wire etc.
Wire Speed (Max.) : 1000m/min.

Hand held Model
– for Low Tension Measurement.
Analog Tension Meter

ZF2 Series

Low Tension Measurements made possible on Analog Tension Meter.

- Series of 6 types for Max. 1 ～ 5 cN ultra low tension to 100 cN.
- Pressing the trigger, easy measurement by pinching between the measurement wire measuring roller and guide roller.
- Operatically considered slim measuring (230g) and compact design.

Width 125 x Height 155 x Thickness 30mm

Model	Maximum Load	
ZF2-5	1 ～ 5cN	1.020 ～ 5.099g
ZF2-10	1 ～ 10cN	1.020 ～ 10.20g
ZF2-20	2 ～ 20cN	2.039 ～ 20.39g
ZF2-30	3 ～ 30cN	3.059 ～ 30.59g
ZF2-50	5 ～ 50cN	5.099 ～ 50.99g
ZF2-100	10 ～ 100cN	10.20 ～ 102.0g

Roller Span : 22mm
Accuracy : ± 1%/R.C. or ±1 Scale

＊For 20K, 50K, 100K please enquire.

For details refer to pages 17 ～ 18

■ DTMX- □ C Series/DTMB- □ C Series

Model		DTMX-0.2C	DTMX-0.5C	DTMX-1C	DTMX-2C	DTMX-2.5C	DTMX-5C	DTMX-10C	DTMX-20C
	High Function Model (with Output)								
	Common Use Model (without Output)	DTMB-0.2C	DTMB-0.5C	DTMB-1C	DTMB-2C	DTMB-2.5C	DTMB-5C	DTMB-10C	DTMB-20C
Rated Capacity (R.C.) Note1		196.1cN(200.0g)	490.3cN(500.0g)	981cN(1000g)	1961cN(2000g)	2452cN(2500g)	4903cN(5000g)	9.81daN(10.00kg)	19.61daN(20.00kg) Note3)
Display Possible Scope		0.0 ～ 200.0cN	4.0 ～ 500.0cN	100 ～ 1000cN	200 ～ 2000cN	250 ～ 2500cN	500 ～ 5000cN	1.00 ～ 10.00daN	2.00 ～ 20.00daN
Measurement Wire	Thread	<1000 Denier or <Ø0.15	φ 0.05 ～ φ 0.25	φ 0.1 ～ φ 0.4	φ 0.3 ～ φ 0.7	φ 0.3 ～ φ 0.7	φ 0.5 ～ φ 1.2	φ 0.7 ～ φ 1.4	As per sample Customer's special calibration will be performed.
	Steel Wire	Less than φ 0.08	φ 0.01 ～ φ 0.15	φ 0.05 ～ φ 0.25	φ 0.15 ～ φ 0.4	φ 0.15 ～ φ 0.4	φ 0.3 ～ φ 0.7	φ 0.4 ～ φ 0.8	
	Copper Wire	Less than φ 0.15	φ 0.05 ～ φ 0.25	φ 0.1 ～ φ 0.4	φ 0.3 ～ φ 0.6	φ 0.3 ～ φ 0.6	φ 0.4 ～ φ 1.0	φ 0.7 ～ φ 1.2	
Roller Span		38mm				100mm			150mm・200mm
Roller		Ø12 Hard Coat Aluminum							
Accuracy (when Wire is static)		± 1% R.C.		± 1.5% R.C.					
Measurement Period		0.5, 1, 2, 4 Switching Over Type							
Memory	DTMX- □ C	Final Measurement Value, Max. Value, Min. Value, PEAK Value, Measurement Data 100 items, (Memory Back-up through Battery), Statistical Data Note5							
	DTMB- □ C	Final Measurement Value, Max. Value, Min. Value, PEAK Value							
Maximum Speed Note4		1000m/min							
Field Adjustment		Max. ± 10.5% of reading, per 1 notch ±1.5%							
Display Equipment		4 Digit LCD. Letter Height 11.5mm							
Output Signal (DTMX- □ C)	Analog Output	0 ～ 1 VDC(Towards Display Possible Scope), (D/A Output Transmission Time about 16msec. Resolution capacity 3000), Load Resistance more than 2kΩ							
	Digital Output	RS-232C or Digimatic (Selectable)							
Working Temperature/Working Humidity		0 ～ 45℃ / Below 90% R.H.							
Current		AA Size Dry Cell x 4 Nos. (with Alkali Battery, continuous running of about 20 hours) or A.C. Adapter (Optional)							
Dimensions	Outer Shape	Width 76 × Thickness 48 × Length 257mm							
	Wire Guide	Width 65mm							
Weight		About 650g				About700 g			
Accessories		AA Alkali Dry Battery 4 Nos., Carrying Case							
Utility Examples (Excluding Standard Measurement Wire)		・Flexible Thread ・Less than Ø0.15 Metal Thread, Silver Thread ・Coated format Optical Fiber ・Synthetic Fiber Winder	・Optical Fiber ・Opt. Fiber gathering M/c. ・Carbon Fiber ・Copper Winder ・Steel Wire gathering M/c	・Aramid Fiber ・Film for condenser ・Food stuffs film ・Up to Ø0.3 Brass Wire ・Copper Winder ・Magnetic Tape	・Carbon Fiber ・Steel wire up to Ø0.1 ・Copper Foil for Electrical wire. (width 20 x 0.1t) ・Tire Code	・Specially, bending angle small things, material demand. ・Steel Wire for OA. (Copy machine, printer for OA)	・Carbon Fiber ・Measuring Tape (10mm Wide × 0.05t)	・Tungsten Wire up to Ø 0.8 ・Flat or Timing Belt up to width 15mm	・Customer's Sample Wire.

■ ZF2 Series

Model	ZF2-5	ZF2-10	ZF2-20	ZF2-30	ZF2-50	ZF2-100
Rated Capacity (R.C.)	1 ～ 5cN (1.020 ～ 5.099g)	1 ～ 10cN (1.020 ～ 10.20g)	2 ～ 20cN (2.039 ～ 20.39g)	3 ～ 30cN (3.059 ～ 30.59g)	5 ～ 50cN (5.099 ～ 50.99g)	10 ～ 100cN (10.20 ～ 102.0g)
Measurement Wire	Thread : Less than φ 0.15mm					
Roller Span	22mm					
Roller	Hard Coat Aluminum					
Accuracy	± 1% R.C/R.C. or ± 1 Scale					
Speed Note	MAX.900m/min					
Working Temperature	8 ～ 45℃					
Working Humidity	85%以下					
Case Material	Delrin					
Outer Dimensions	Width 125 × Thickness 30×Length 155mm					
Weight	About 230kg					
Accessories	Carrying Case					

＊ Roller Wearing or measuring wire effect (winding etc.), no guarantee for accuracy.

Note 1 : R.C. = Rated Capacity
Note 2 : Our Company Standard Wire Calibration is as under :
Thread : For Hanging – Nylon Thread.
Steel Wire : SUS304(Hardness Hv531 ～ 541)
Copper Wire : Tinning Soft Copper Wire (Hardness Hv69 ～ 82)
Further if the measurement items apt to vibrate, or if they are like rubber inflection etc., then there would be no accuracy guarantee and hence inquire beforehand. Further, for out of specification items, measurement error may arise and hence take caution.
Note 3 : Depending upon the wire material, it may not cope-up and hence please inquire
Note 4 : For Roller Wearing or measuring wire effect (winding etc.), no guarantee for accuracy
Note 5 : Statistic Data

Sample Frequency(DATA) : in
Maximum Value(MAX) : Xmax
Minimum Value(MIN) : Xmin
Average Value(AVG) : $\Sigma Xi/n = \bar{x}$
Standard Deviation(DEV) : $\sqrt{\Sigma (Xi-\bar{x})/n}$

■ PLS- □ G Series

Model	PLS-10G	PLS-20G	PLS-50G
Rated Capacity (R.C.)	9.81cN (10g)	19.61cN (20g)	49.03cN (50g)
Measurement Item (Measurement Wire)	Metal Wire of Less Than Ø0.06mm Note1		
Allowable Over Load	± 200% /R.C.		
	± 2% /R.O. Note2		
Wire Speed (Max.) Note3	500m/min		
Roller Shape	φ 15mm "V" Groove Ceramic Roller		
Environment Endurance	Liberation Model (Sensor Parts, Bearing Parts) Note 4		
Working Temperature	10 ～ 40℃		
Connected Cables	φ 3mm Sealed Cable Length 3mIndicator		
Indicator	CSD-819 Attached. (with Analogue, comparator output)		
Dimensions	Width 67 × Thickness 33 × Length 101mm		
Weight	About 150kg.		

. Note 1 : Measurement is possible for Textile Fiber, Metal Wire about Ø0.06mm. However, the test results depend on the sample supplied.
Note 2 : The Value is for Static Condition : (wire speed 0, wire not moving)
Note 3 : ＊ Roller Wearing or measuring wire effect (winding etc.), no guarantee for accuracy.
Note 4 : This is not the Preserving Structure as against Very small particles, liquid etc.

■ Indicator CSD-819C

Model		CSD-819C		
Detector Corresponding Model		PLS-10G	PLS-20G	PLS-50G
Non-Straight Line		within 0.196/FS		
Analog Film		100Hz Note (Switch Over possible for 10, 100, 1000Hz)		
A/D Sampling		2000 Rev./Sec. Note		
	Display Scope	0.00 ～ 10.00cN	0.00 ～ 20.00cN	0.00 ～ 50.00cN
	Indicator Resolution Capacity	0.10cN	0.20cN	0.50cN
		(0.01、0.02、0.05、0.10、0.20、0.50 Selectable)		
	Display Equip. Frequency	20Rev./Sec. (Switch Over possible at 4,20,50,100R/S)		
	Display Equipment	Red Color 7 Segment LED Letter Height 17.0mm		
	Mode Display	PEAK, BOTTOM, ZONE (LED Display)		
	Decision Display	S0、S1、S2、S3、S4		
Measurement Mode		Track, Peak Hold, Bottom Hold, Peak Bottom Hold, Segment Peak Hold, Segment Bottom Hold		
	Analog Output	DC 10V(At Rated Pulling Power)		
	Comparator	Setting at 5 Points, Open Corrector Output		
	Outer Parts Control	ZERO, PEAK/TRACK, HOLD etc.		
Working Temp & Humidity Scope		0 ～ 50oC, <85%RH(However, condensation not allowed)		
Current		AC100V ～ 240V 50/60Hz, About 15VA (Permissible Scope AC-85 ～ 264V)		
Outer Dimensions		Width 96 x Height 96 x Depth 129.5mm		
Weight		About 600 kg		

Settings at Shipping. If disturbed, it may affect the Noise, Response etc.

■ PLS- □ K- □ - □ B Series

Model		PLS-0.2K-	PLS-0.5K-	PLS-1K-	PLS-2K-	PLS-5K-	PLS-10K-
Rated Capacity (R.C.)		1.961N (0.2kg)	4.903N (0.5kg)	9.807N (1kg)	19.61N (2kg)	49.03N (5kg)	98.07N (10kg)
Measurement Items Note1	Thread	φ < 0.15	φ < 0.25	φ < 0.4	φ < 0.7	φ < 1.2	φ < 1.4
	Steel Wire	φ < 0.08	φ < 0.15	φ < 0.25	φ < 0.4	φ < 0.7	φ < 0.8
	Copper Wire	φ < 0.15	φ < 0.25	φ < 0.4	φ < 0.6	φ < 1.0	φ < 1.2
Wire Speed (MAX) Note 2		1000m/min					
Detection Roller Displacement		Max. 0.3mm/ at Rated Pulling Power					
Roller Shape		φ 12mm "V" Groove Roller				φ 22mm "V" Groove Roller	
Roller Span		50mm				100mm	
Allowable Over Load		± 200% /R.C.					
Measurement Accuracy (when measurement wire is static) Note 3		± 1% /R.O.					
Rated Output Note 4		DC10V					
Input Current		DC12V(10.5 ～ 15.5V)0.15A, as per specification DC-5V, DC-24V is possible					
Cable Length		2m					
Weight		About 630g				1kg	
Preservative Structure		IP52					

■ PLS- □ K- □ - □ C Series

Model	PLS-0.2K-	PLS-0.5K-	PLS-1K-	PLS-2K-	PLS-5K-	PLS-10K-
Rated Capacity (R.C.)	1.961N (0.2kg)	4.903N (0.5kg)	9.807N (1kgf)	19.61N (2kg)	49.03N (5kg)	98.07N (10kg)
Measurement Item	< 10, 15, 20, 30mm, Thickness < 0.2mm					
Wire Speed (MAX) Note 2	300m/min Note 1					
Detection Roller Displacement	Max. 0.3mm/ at Rated Pulling Power					
Roller Shape	φ 13mm Cylindrical Roller width 10,15,20,30mm				φ 20mm Cyl. Roller	
Roller Span	50mm				100mm	
Allowable Over Load	± 200% /R.C.					
Measurement Accuracy (when measurement wire is static) Note 3	± 1% /R.O.					
Rated Output Note 4	DC10V					
Input Current	DC12V(10.5 ～ 15.5V)0.15A, as per specification DC-5V, DC-24V is possible					
Cable Length	2m					
Weight	About 630g				1kg	
Preservative Structure	IP52					

Note 1 : Our company standard wire calibration is as follows :
Thread : For Hanging – Nylon Thread. Steel Wire : SUS304(Hardness Hv531 ～ 541) Copper Wire : Tinning Soft Copper Wire (Hardness Hv69 ～ 82)
Note 2 : For Roller Wearing or measuring wire effect (winding etc.), no guarantee for accuracy
Note 3 : Depending upon material quality sometimes, accuracy guarantee cannot be given so please inquire.
Note 4 : Depending upon material quality, there may be some variations.

● R.C. = RATED CAPACITY
● 1cN = 1.0197g = 0.01N
● 1daN = 10N ≒ 1.02kg （1kg ≒ 9.8N = 0.98daN）