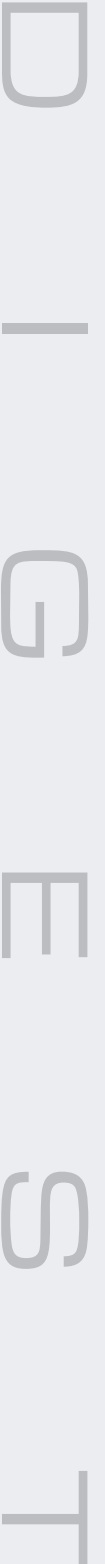




Digest Version

Force/Tension Measuring Instruments Series

- DORCE GAUGES
- TEST STAND FOR FORCE GAUGES
- TENSION METERS



Force Gauges

Ideal for measurements of various "forces", such as pressing force, tensile force, each type of intensity, and peel force.

<p>Communication Enhancing Type (with output)</p> <p>FGPX Series</p>  <p>CE P3</p>	<p>Communication Enhancing Type (with output)</p> <p>FGPX H Series</p>  <p>CE P3</p>	<p>High-Performance Type (with output)</p> <p>FGP Series</p>  <p>CE P4</p>	<p>Economic Type (without output)</p> <p>FGJN Series</p>  <p>CE P5</p>
<p>Analog Force Gauges</p> <p>MF Series</p>  <p>P7</p>	<p>Sensor Isolated Type Digital Force Gauges</p> <p>FGPX-RT Series</p>  <p>P8</p>	<p>Rheo Tester</p> <p>FGRT Series</p>  <p>P9</p>	<p>Measurement Data Wireless Transceiver Equipment</p> <p>TELEMEASURE</p>  <p>P8</p>

Equipped with easy and useful functions for "force" measurements necessary for research development and quality management.



*FGPX Series

Free

Test results can be imported to a PC using the specialized software "TORIEMON USB".

(Free downloads from website)



Test Stands

Install a force gauge to use as a simple test machine.

<p>Load Simple Test Stand</p> <p>FGS-50E-L (Low Speed Specifications) FGS-50E-H (High Speed Specifications)</p>  <p>P10</p>	<p>Motorized Test Stands for Force Gauges (Vertical Type)</p> <p>FGS-100VC/250VC</p>  <p>P11</p>	<p>Compact Desktop Test Stands</p> <p>FGS-TV</p>  <p>P14</p>	<p>Motorized (Horizontal Type)</p> <p>FGS-50XB-L (Low Speed Specifications) FGS-50XB-H (High Speed Specifications)</p>  <p>P12</p>
<p>Manual Lever Type</p> <p>FGS-5S</p>  <p>P13</p>	<p>Manual Lever Type</p> <p>FGS-50L</p>  <p>P13</p>	<p>Manual Handle Type</p> <p>FGS-50H</p>  <p>P12</p>	<p>Exclusive Jigs</p>  <p>P15</p>

Tension Measurement

<p>High-Performance Type Hand Held Model Digital Tension Meters (with output)</p> <p>DTMX Series</p>  <p>P18</p>	<p>Hand Held Model Analog Tension Meters for Low Tension Measurement</p> <p>ZF2 Series</p>  <p>P19</p>	<p>Stand Alone Type Tension Meters for Tapes, Films, and Belts</p> <p>PLS-□K-□-□C Series</p>  <p>P20</p>	<p>Stand Alone Type General Purpose Tension Meters</p> <p>PLS- □K- □-□B Series</p>  <p>P21</p>	<p>Pulling/Pushing Amplifier Built-in Model Load Cells</p> <p>PLC Series</p>  <p>P19</p>
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Product Specification Icons

USB Equipped with USB communication function	1000 times/sec Enables high-speed peak measurement of 1000 times/sec	Motored Enables automatic measurement through the motor	Digimatic Can connect to a Mitsutoyo Digimatic Printer
RS-232C output Can connect to a PC or printer	D/A analog output Can connect to a pen recorder for storing data	Manual Enables high-speed measurement by manual operation	LED comparator Can set, judge, and output upper and lower limits (LEDs display)
Hanger With attached hanger for storage or suspension	Unit Can change units between N and kg (g)	Digital display Can digitally display forward speed and shift distance	External zeroing Enables zeroing using external signals
Comparator Can set, judge, and output upper and lower limits	Overload Can output signals to protect the main unit when overloaded	Analog output Can connect to a pen recorder for storing data	External signal Can switch among a hold function that holds the indicated value, zeroing function, and PEAK mode
Reverse display Can turn numbers and units upside down on LCD display	Push Pull Peak Can register and indicate each peak value of pressing and pulling	Program setting Can set the movement program	Supports length meter Can be installed with the Mitsutoyo length meter (optional)
Memory 1000 Can continuously store up to 1000 sets of measurement data. Enables statistics processing, such as for max. and min. values	Import Can import data using the specialized free software	Standard software Can import data using the standard software (optional)	

Digital Force Gauges



Model	Maximum load	
FGPX-0.2	±2.000N	0.2kg
FGPX-0.5	±5.000N	0.5kg
FGPX-1	±10.00N	1kg
FGPX-2	±20.00N	2kg
FGPX-5	±50.00N	5kg
FGPX-10	±100.0N	10kg
FGPX-20	±200.0N	20kg
FGPX-50	±500.0N	50kg
FGPX-100	±1000N	100kg
FGPX-250H	±2500N	250kg
FGPX-500H	±5000N	500kg

Communication Enhancing Type (with output) FGPX Series FGPX H Series

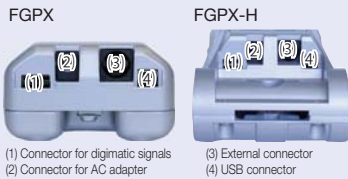
Equipped with enhanced communication and memory functions

USB	Memory 1000	1000 times/sec	RS-232C output	D/A analog output
LED comparator	Overload	Reverse display	Push Pull Peak	Hanger
Unit	Digimatic	External zeroing	External signal	

TORIEMON USB Free downloads from website

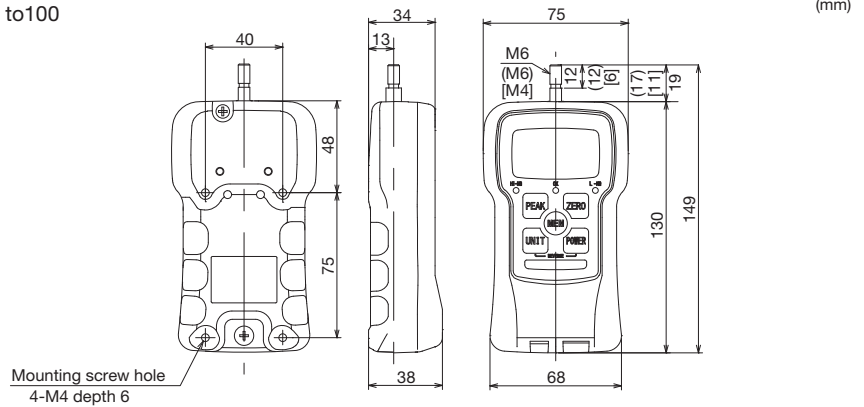
Communication functions for both input and output have been enhanced. Test results can be imported to a PC using the specialized software "TORIEMON USB".

- Indicates judgment results using LEDs, which allows you to check immediately
Indicates "HI, LO, OK" using LEDs. Also capable of signal output.
- Can import data by connecting through a PC USB port
- Can connect to a Mitsutoyo Digimatic Printer
- Can switch among a hold function that holds the indicated value, zeroing function, and PEAK mode



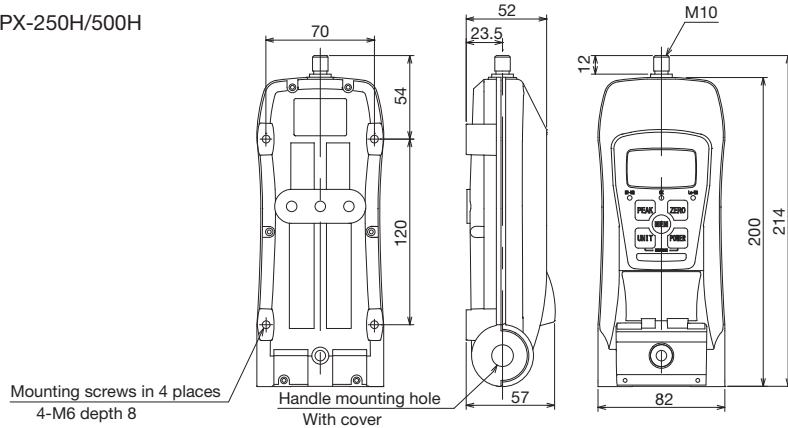
Dimensional drawing

FGPX-0.2 to100



The values in parentheses () show dimensions for FGPX-1 to 50.
The values in parentheses [] show dimensions for FGPX-0.2 to 0.5.
(Dimensions of other parts are common in all models)

FGPX-250H/500H



Specifications

Model	FGPX-0.2	FGPX-0.5	FGPX-1	FGPX-2	FGPX-5	FGPX-10	FGPX-20	FGPX-50	FGPX-100	FGPX-250H	FGPX-500H
Rated capacity (R.C.) ^{Note 1)}	±2.000N (±200.0g)	±5.000N (±500.0g)	±10.00N (±1000g)	±20.00N (±2.000kg)	±50.00N (±5.000kg)	±100.0N (±10.00kg)	±200.0N (±20.00kg)	±500.0N (±50.00kg)	±1000N (±100.0kg)	±2500N (±250.0kg)	±5000N (±500.0kg)
Available display range	±2.000N (±200.0g)	±5.000N (±500.0g)	±10.00N (±1000g)	±20.00N (±2.000kg)	±50.00N (±5.000kg)	±100.0N (±10.00kg)	±200.0N (±20.00kg)	±500.0N (±50.00kg)	±1000N (±100.0kg)	±2500N (±250.0kg)	±5000N (±500.0kg)
Display resolution	0.001N/0.1g		0.01N/1g	0.01N/0.001kg			0.1N/0.01kg		1N/0.1kg		
Unit	Unit change between N and kg (g) (reverse display available)										
Measurement method	Normal measurement, plus peak, minus peak										
Display cycle	1 time/sec, 2 times/sec, 3 times/sec, 5 times/sec, 10 times/sec, 20 times/sec										
Sampling cycle	1000 times/sec ^{Note 2)}										
Accuracy	±0.2%R.C. and ±1/2digit (at 23°C) ^{Note 3)}										
Display	•LCD Signed 4-digit display (Font height: 12mm) •Judgment LEDs (Hi, NG, OK, Lo, NG) 3 pieces										
Overload capacity	200%R.C.									150%R.C.	
Comparator function	Judges Hi, NG, OK, and Lo, NG, and outputs using the judgment LEDs and output signals										
Communications	[USB] Provided (PCs can communicate with the unit using the specialized communication software. A connection cable is a standard accessory.) [RS-232C] Provided (PCs can communicate with the unit using the specialized communication commands. A connection cable is an optional accessory.) Can connect to a Mitsutoyo Digimatic Printer										
Analog	•±1V (Outputs for the available range of ± display), accuracy ±50mV, 12bit/D/A converter method •Output updates: 1000 times/sec, zero setting available, load resistance 10kΩ or more										
Output	[Overload] PUSH, PULL Open collector output (max. DC30V/5mA) [Comparator] HI, OK, LO Open collector output (max. DC30V/5mA)										
Input signal	ZERO (external zero setting), HOLD (external hold), PEAK (peak mode setting)										
Power	•AC adapter (DC9V/200mA) or built-in NiMH battery (rechargeable), measurement available during charging •Battery operating time: Approx. 10 hours from full charge •Charging time: Max. 17 hours (Automatically ends when fully charged)										
Auto power off function	10 min (The unit can be used while connected to the AC adapter), this function can be disabled.										
Memory function	•Continuous memory 1000 sets/Single memory 100 sets/Standard memory 50 sets (can be switched between the three memory modes) •Equipped with statistics function (max., min., peak, average, standard deviation)										
Operating temperature (humidity) range	[Temperature]0 to 40°C (No condensation) [Humidity]35 to 85%RH (No condensation)										
External dimensions	Width 75 x Thickness 38 x Length 141mm			Width 75 x Thickness 38 x Length 147mm				Only Length 149mm		Width 82 x Thickness 57 x Length 214mm	
Weight	Approx. 450kg										
Accessories	Measurement adapters (6 types), hanger, AC adapter, carrying case, USB cable, handle (only for FGPX-□H)										
Communication software	Specialized communication software (USB compatible) Free downloads from website										

Note 1) R.C.=RATED CAPACITY

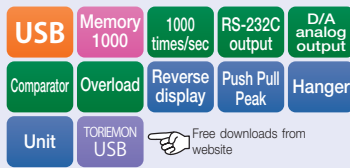
Note 2) 150 times/sec when the measurement filter (f05) is set to 150msec.

Note 3) "digit" means 1 count for digital display. ±1digit means the last digit has 1 count tolerance of digital counting.



High-Performance Type (with output) FGP Series

Extensive measurement functions



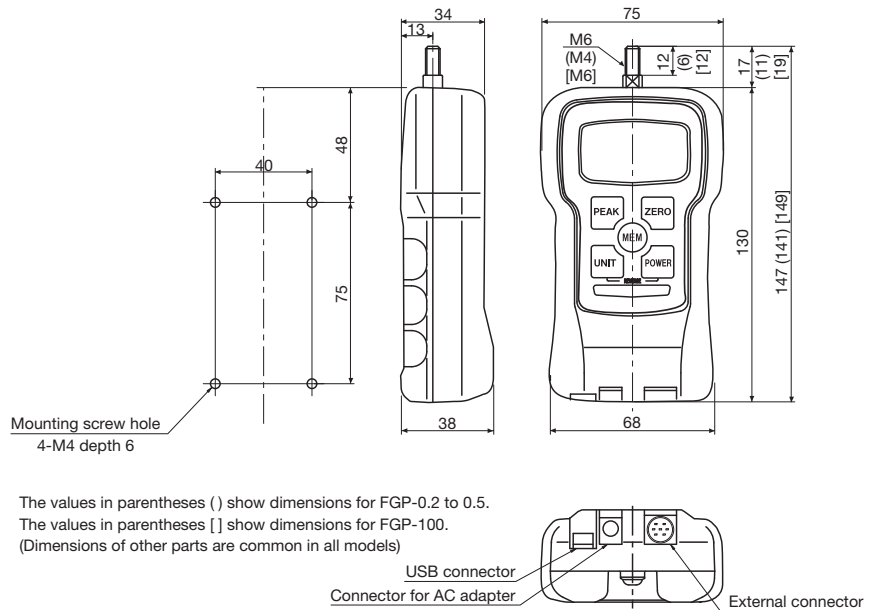
Using with a motorized test stand widens the variety of uses. Test results can be imported to a PC using the specialized software "TORIEMON USB".

- A USB interface makes adoption data import to a PC easy
- Provides 3 memory modes: Continuous, Single, and Standard
Up to 1000 sets can be stored (continuous memory mode)
- Widens the variety of measurements when used with a motorized test stand
- Equipped with a comparator function
- Setting upper and lower limit values enables acceptance of measurement values judgment

Model	Maximum load	
FGP-0.2	±2.000N	0.2kg
FGP-0.5	±5.000N	0.5kg
FGP-1	±10.00N	1kg
FGP-2	±20.00N	2kg
FGP-5	±50.00N	5kg
FGP-10	±100.0N	10kg
FGP-20	±200.0N	20kg
FGP-50	±500.0N	50kg
FGP-100	±1000N	100kg

Dimensional drawing

(mm)



The values in parentheses () show dimensions for FGP-0.2 to 0.5.
The values in parentheses [] show dimensions for FGP-100.
(Dimensions of other parts are common in all models)

Specifications

Model	FGP-0.2	FGP-0.5	FGP-1	FGP-2	FGP-5	FGP-10	FGP-20	FGP-50	FGP-100	
Rated capacity (R.C.) ^{Note 1)}	±2.000N (±200.0g)	±5.000N (±500.0g)	±10.00N (±1000g)	±20.00N (±2.000kg)	±50.00N (±5.000kg)	±100.0N (±10.00kg)	±200.0N (±20.00kg)	±500.0N (±50.00kg)	±1000N (±100.0kg)	
Available display range	±2.000N (±200.0g)	±5.000N (±500.0g)	±10.00N (±1000g)	±20.00N (±2.000kg)	±50.00N (±5.000kg)	±100.0N (±10.00kg)	±200.0N (±20.00kg)	±500.0N (±50.00kg)	±1000N (±100.0kg)	
Display resolution	0.001N/0.1g		0.01N/1g	0.01N/0.001kg		0.1N/0.01kg		1N/0.1kg		
Unit	Unit change between N and kg (g) (reverse display available)									
Measurement method	Normal measurement, plus peak measurement, minus peak measurement									
Display cycle	1 time/sec, 2 times/sec, 3 times/sec, 5 times/sec, 10 times/sec, 20 times/sec									
Sampling cycle	1000 times/sec ^{Note 2)}									
Accuracy	±0.2%R.C. and ±1/2digit (at 23°C)									
Display	Number display/Unit display	Signed 4-digit display (Font height: 12mm) Signs can be optionally set for the load direction, reverse display available/3-digit LCD display (Font height: 7mm)								
	Various display	(1)*LO BAT* (low battery voltage) (2)*BAT* (during charging) (3)*OVR* (overload) (4)*PEAK* (peak hold mode)								
Overload capacity	200%R.C.								150%R.C.	
Tracking function	Provided (can be switched ON/OFF)									
Output signal	USB	Provided (PCs can communicate with the unit using the specialized communication software. A connection cable is a standard accessory.) Continuous transmission max. 100 times/sec								
	Other outputs	RS-232C Analog Overload Comparator (only for FGP-□) Other cables including analog cables are optional.								
Power	*AC adapter (DC9V/200mA) or built-in NiMH battery (rechargeable) *Measurement available during charging *Battery operating time: Approx. 8 hours from full charge *Charging time: Max. 16 hours (Automatically ends when fully charged)									
Auto power off function	10 min (The unit can be used while connected to the AC adapter), this function can be disabled.									
Memory function	*Continuous memory 1000 sets/Single memory 100 sets/Standard memory 50 sets (can be switched between the three memory modes) *Equipped with statistics function (max., min., peak, average, standard deviation)									
Comparator function	Available (upper and lower limits)									
Operating temperature (humidity) range	[Temperature]0 to 40°C (No condensation) [Humidity]35 to 85%RH (No condensation)									
External dimensions	Width 75 x Thickness 38 x Length 141mm			Width 75 x Thickness 38 x Length 147mm					Only Length 149mm	
Weight	Approx. 450kg								Approx. 500kg	
Accessories	Measurement adapters (6 types) ^{Note 3)} , hanger, AC adapter, carrying case, USB cable									
Communication software	Specialized communication software (USB compatible) Free downloads from website									

Note 1) R.C.=RATED CAPACITY Note 2) 150 times/sec when the measurement filter (f05) is set to 150msec.
Note 3) M4 measurement adapters are supplied for models of 0.5 or less, and M6 measurement adapters for those of 1 or more.

Digital Force Gauges



Economic type (without output) FGJN Series

Digitally display measurement results

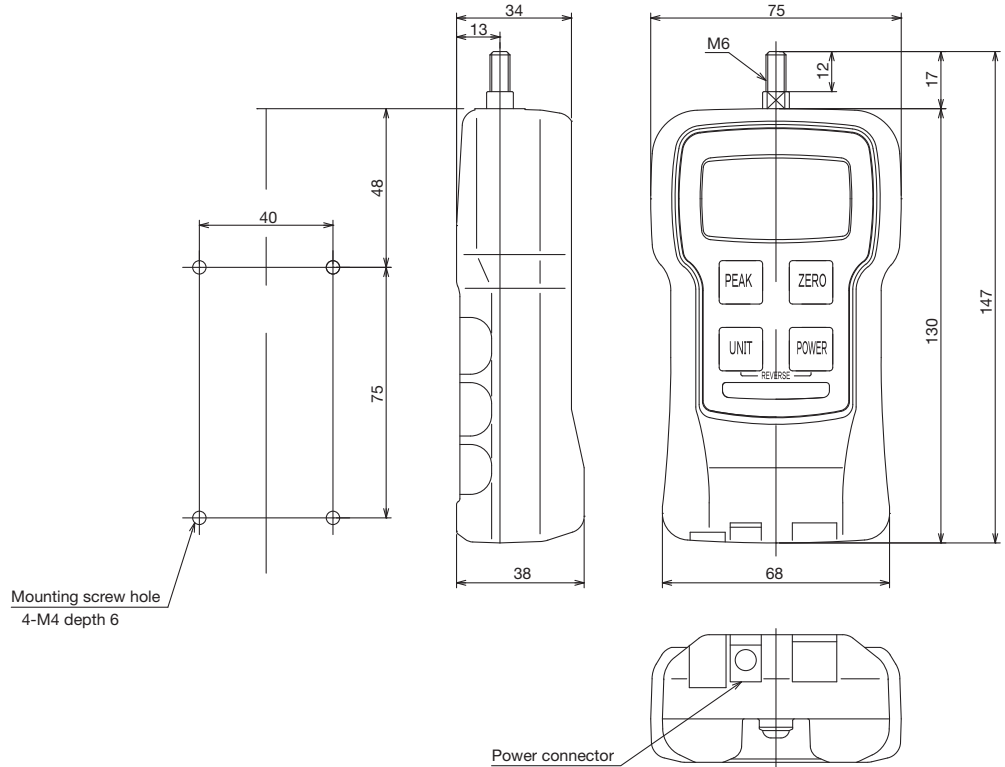


- Using a NiMH battery enables long time operation
- Rated capacity: 20.00N (2.000kg) to 500.0N (50.00kg)
- Adopts the reverse method to turn the displayed numerical value and unit upside down with the press of a button
- Can change the unit between N and kg (g) with the press of a button
- Can measure each peak value for the plus and minus sides (peak hold).
- High-speed peak measurement of 1000 times/sec
- The measurement frequency (display cycle) can be selected from options of up to 20 times/sec

Model	Maximum load	
	FGJN-2	±20.00N
FGJN-5	±50.00N	5kg
FGJN-20	±200.0N	20kg
FGJN-50	±500.0N	50kg

Dimensional drawing

(mm)



Mounting screw hole
4-M4 depth 6







Power connector

Specifications

Model	FGJN-2	FGJN-5	FGJN-20	FGJN-50
Rated capacity (R.C.) <small>Note 1)</small>	±20.00N (±2.000kg)	±50.00N (±5.000kg)	±200.0N (±20.00kg)	±500.0N (±50.00kg)
Available display range	±20.00N ±2.000kg	±50.00N ±5.000kg	±200.0N ±20.00kg	±500.0N ±50.00kg
Display resolution	0.01N/0.001kg		0.1N/0.01kg	
Unit	Unit change between N and kg (reverse display available)			
Measurement method	Normal measurement, plus peak measurement, minus peak measurement			
Display cycle	1 time/sec, 2 times/sec, 3 times/sec, 5 times/sec, 10 times/sec, 20 times/sec			
Sampling cycle	1000 times/sec			
Accuracy	±0.3%R.C. and ±1/2digit (at 23°C)			
Temperature effect	Gain: ±0.03%/LOAD/°C, Zero : ±0.02%/R.C./°C (Zero point drift can be canceled using the tracking function)			
Display	Number display: Signed 4-digit LCD display (Signs can be optionally set for the load direction, reverse (upside-down) display available) Font height: 12mm Unit display: 3-digit display (Font height: 7mm) Various display: (1)*LO BAT* (low battery voltage)(2)*BAT* (during charging)(3)*OVR* (overload)(4)*PEAK* (peak hold mode)			
Overload capacity	200%R.C			
Tracking function	Provided (can be switched ON/OFF)			
Power	AC adapter (DC9V/200mA) or built-in NiMH battery (rechargeable) Measurement available during charging, Battery operating time: Approx. 8 hours from full charge Charging time: Max. 12 hours (Automatically ends when fully charged)			
Auto power off function	10 min (The unit can be used while connected to the AC adapter), or OFF			
Operating temperature range	0 to 40°C (No condensation)			
Operating humidity range	35 to 85%RH (No condensation)			
External dimensions	Width 75 x Thickness 38 x Length 147mm			
Weight	Approx. 450g			
Accessories	Measurement adapters (6 types), hanger, AC adapter, carrying case			

Note 1) R.C.=RATED CAPACITY

Force Gauge Attachment Adapters (as a set supplied with the main unit)

Shape						
FGPX FGP FGJN (for M6)	Round drill 70°	Mountain shape 70°	V groove 70°	ø12mm	Hook	L : 92mm
•M4 measurement adapters are attached for models of 0.5N or less.						
MF (for M6)	Round drill 90°	Mountain shape 90°	V groove 90°	ø15mm	Hook	L : 90mm
•Adapters include a total of the 8 types mentioned above, big hook, and hook meter. For attachments for the 200N to 500N models, contact us separately.						

*Shapes may differ slightly depending on sizes. For details, contact us.

TOREMON
USB

Data Import Software Specialized for FGP·FGPX

TORIEMON USB

■ Functions

Use the USB cable and connect the unit to a PC. The specialized data import software "TORIEMON USB" (that can be downloaded free of charge from our website) can be used to import test results to the PC.

- Trigger (Starts data import when the specified load is attained)
- Single data import (measurement data, ±peak data)
- Continuous data import
- Import capacity: Can be set to up to 65,000 sets
- Import interval: 10, 20, 50, 100 times/sec
- Can import data by connecting through a USB port on a PC
- Equipped with the USB communication function, it's easy to connect to a PC.



Analog Force Gauges



Analog Force Gauges MF Series

Extensive measurement functions

Analog force gauges with a high level of visibility that can be used without power supply

- Enables measurement in both directions of pulling and pushing
- Solidly built with an aluminum die-cast case
- Indicates peak values using a friction pointer mechanism



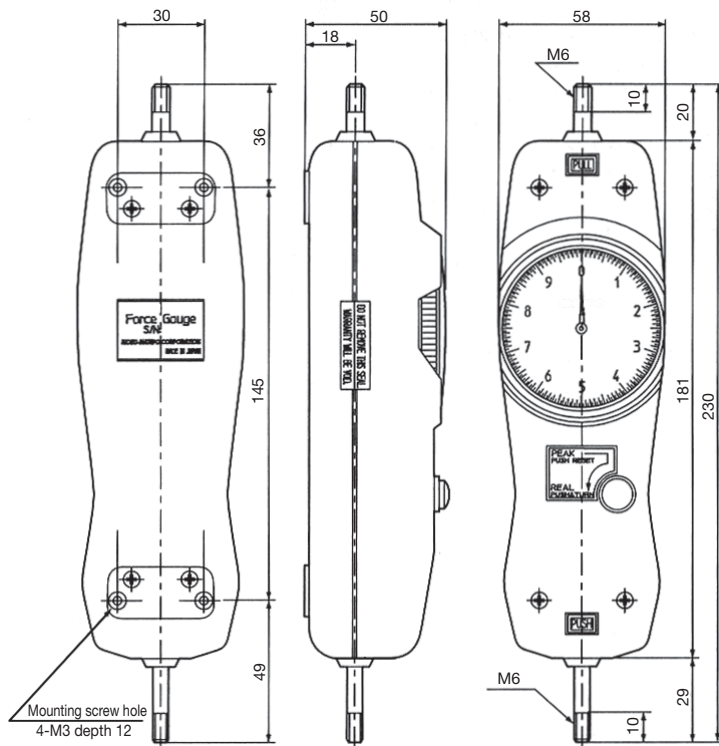
Carrying case

Model	Maximum load	
MF-10N	10N	1.020kg
MF-20N	20N	2.039kg
MF-30N	30N	3.059kg
MF-50N	40N	5.099kg
MF-100N	100N	10.20kg
MF-200N	200N	20.39kg
MF-300N	300N	30.59kg
MF-500N	500N	50.99kg

Accessories
Measurement adapters (8 types), carrying case

Dimensional drawing

(mm)



Specifications

Model	MF-10N	MF-20N	MF-30N	MF-50N	MF-100N	MF-200N	MF-300N	MF-500N
Rated capacity (R.C.) ^{Note 1)}	10N	20N	30N	50N	100N	200N	300N	500N
Minimum scale	0.05N	0.1N	0.2N	0.25N	0.5N	1N	2N	2.5N
Accuracy	±0.2%/R.C.							
Stroke	10mm							
Measurement method	1. Normal measurement (friction pointer: free) 2. Peak measurement (friction pointer: set to the maximum value)							
External dimensions	Width 58 x Thickness 50 x Length 230mm							
Weight	750g							
Accessories	Measurement adapters (8 types), carrying case, instruction manual 1 copy							

Note 1) R.C.=RATED CAPACITY

Sensor Isolated Type Digital Force Gauges



Measurement part

Display part

Sensor Isolated Type Digital Force Gauges FGPX-RT Series

Enables measurement in a small space

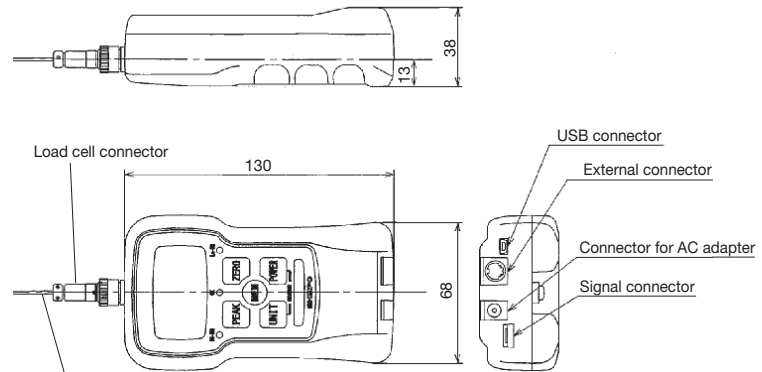
*For supported sensor parts, contact us separately.

USB	Memory 1000	1000 times/sec	RS-232C output	D/A analog output
Comparator	Overload	Reverse display	Push Pull Peak	Hanger
Unit	TORIEMON USB	Free downloads from website		

- Supports the wide range of loads ($\pm 2.000N$ to $\pm 1000N$) by replacing sensor parts
- Enables measurement even in a small space or distant place that has not been able to accommodate the main unit before
- Can store 5 types of load cell calibration data in the main unit
- Test results can be imported to a PC using the specialized software "TORIEMON USB"

Dimensional drawing

(mm)



An optional load cell is supplied.

*For order, specify the models for the main unit (FGPX-RT) and load cell.

Specifications

Model		FGPX-RT
Load cell		Isolated type Isolated type load cell: 5 pieces Stores up to 5 types of calibration data
Measurement unit		N or kg unit system
Measurement method		Average, peak
Sampling cycle		1000 times/sec
Display cycle		1 time/sec to 20 times/sec
Display		LCD
Reversed display		Available
Power		NIMH battery AC adapter
Battery operating time		Approx. 8 hours
Analog		$\pm 1V$
Output	Communications	USB RS-232C
	Output signal	Mitsutoyo (digimatic signals)
	Judgment output	Overload HI, LO, OK
	Input signal	ZERO, HOLD
Memory		1000 sets
External dimensions		75x38x140
Weight		300g
Accessories		AC adapter, carrying case USB cable

*For supported sensor parts, contact us separately.

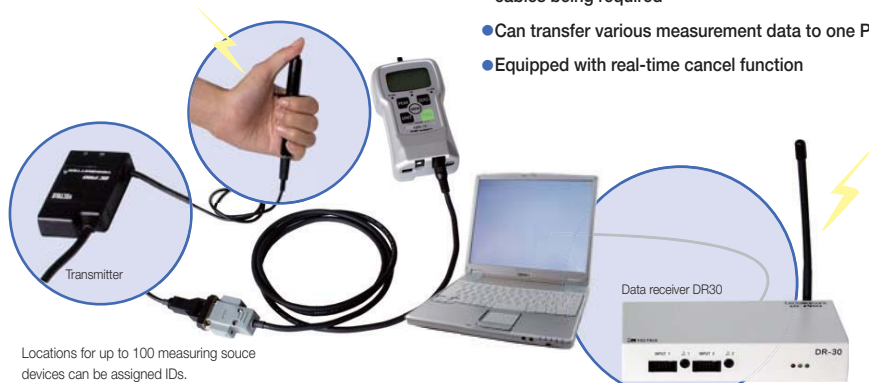
BETRIX CO., LTD. Telemeasure

Measurement Data Wireless Transceiver Equipment

Instantly transfers measurement data

Telemeasure is system equipment used to automatically input measurement data to a PC without cables. Measurement data will be transferred using the ultra-small wireless transmitter installed to a digital measurement device through a wireless receiver (data receiver) connected to a PC. Various quality control management figures, such as inspection result tables or histograms, can be immediately prepared.

- Widely improves operation performance due to no cables being required
- Can transfer various measurement data to one PC
- Equipped with real-time cancel function



Locations for up to 100 measuring source devices can be assigned IDs.

Receives measurement data and automatically inputs to a PC. Actualizes the 2 systems of wireless and wired.

QC PRO

Software to automatically store, calculate, and analyze measurement data. Accomplishes high-level tasks through simple operation.

QC PRO EX

Add-in software to automatically import measurement data transmitted from a Telemeasure receiver into an Excel worksheet.

Transmitter Specifications	
Wireless frequency	VHF 273MHz Weak signals
Transmission distance	10m (within visibility)
Input signal	Digimatic/RS-232C
Power	Coin battery CR2032
External dimensions/Weight	32Wx52Dx13H/23g

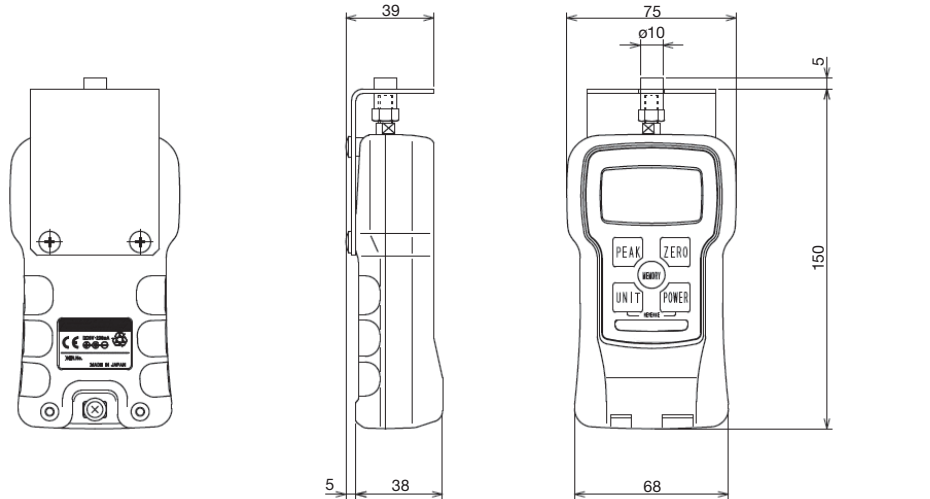
Data receiver DR30 Specifications	
Wireless Specifications	Reception distance: 10m Wireless frequency VHF 273MHz
Wired input	Digimatic signals Flat 10 pinx2
PC output	RS-232C D-sub9 pin
Mini printer output	Digimatic signals Flat 10 pin
ID passing limit function	Sets using DIP switch
Buzzer sound setting	Sets using DIP switch
Operating environment	Temperature 0 to 40°C Humidity 20 to 40%RH
Power	AC100V (Adapter DC9V)
External dimensions	165Wx86Dx30H Excluding rubber shoes and antenna parts

Rheo Tester



Model	Maximum load
FGRT-1	±10N
FGRT-20	±20N
FGRT-50	±50N
FGRT-100	±100N

Dimensional drawing



Rheo Tester FGRT Series

Measures stress



Test results can be imported to a PC using the specialized software "TORIEMON USB".

- Measures the internal reaction force that occurs when an external force is applied to an object, rather than measuring the load
- Enables acceptance of judgment using comparator judgment display
- Stores 1000 sets of measurement data using memory function

Data Import Software Specialized for FGRT-□ RHEOEMON USB



- Trigger (Starts data import when the specified load is attained)
- Single data import (measurement data, ±peak data)
- Continuous data import
Import frequency: Can be set to up to 65,000 sets
Import interval: 10, 20, 50, 100 times/sec
- Memory data import

Specifications

Model	FGRT-1	FGRT-2	FGRT-5	FGRT-10
Rated load capacity [N]	±10N	±20N	±50N	±100N
Unit	kPa [kilopascal]			
Measurement method	Normal measurement/Peak measurement			
Display cycle	Select among 1, 2, 3, 5, 10, 20 time(s)/sec			
Sampling cycle	1000 times/sec			
Accuracy	±0.2% ±1/2digit			
Comparator function	Upper and lower limits Acceptance of judgment function			
Memory function	Can store up to 1000 sets			
Communications	USB	Provided	Communicate with a PC using the specialized software	
	RS-232C	Provided		
	Digimatic	Can connect to a Mitsutoyo Digimatic Printer		
Output	Analog	±1V Accuracy ±50mV		
	Overload	Plus/minus overload		
	Comparator	Upper limit, lower limit, NG Pass/Success		
Input	ZERO	Zeroing/Peak reset		
	HOLD	Display hold		
	PEAK	Measurement mode setting		
Power	Built-in NiMH battery, with AC adapter			

Recommendation of Periodic Calibration

In order to maintain a high level of accuracy, we recommend a periodic calibration of the unit once a year.

Digital force gauges use the specially designed high-accuracy sensors (load cell). In order to maintain a high level of accuracy, we recommend a periodic calibration of the unit once a year.

Complies with ISO/GMP/HACCP

NIDEC-SHIMPO CORPORATION implements periodic calibration, as well as inspection. Furthermore, ISO calibration ensures traceability with documents attached.

ISO calibration consists of a set of 4 documents: certificate of analysis, traceability, official calibration certificate (load), and calibration certificate (main unit).



Force Gauge Stands (Motorized)



Load Simple Test Stands

FGS-50E-L (Low Speed Specifications)

FGS-50E-H (High Speed Specifications)

Motorized stand with a long stroke

Motored
Overload
Digital display
Program setting

Stroke of 400mm.

Can handle various works simply

4 action modes:

Manual/Jogging/1 cycle/Return repetition

Front cover ensures safety

2 types of forward speed

Low Speed Specifications: 6 to 180mm/min

High Speed Specifications: 20 to 400mm/min

Improves visibility in operation performance, from display (LCD) to various settings

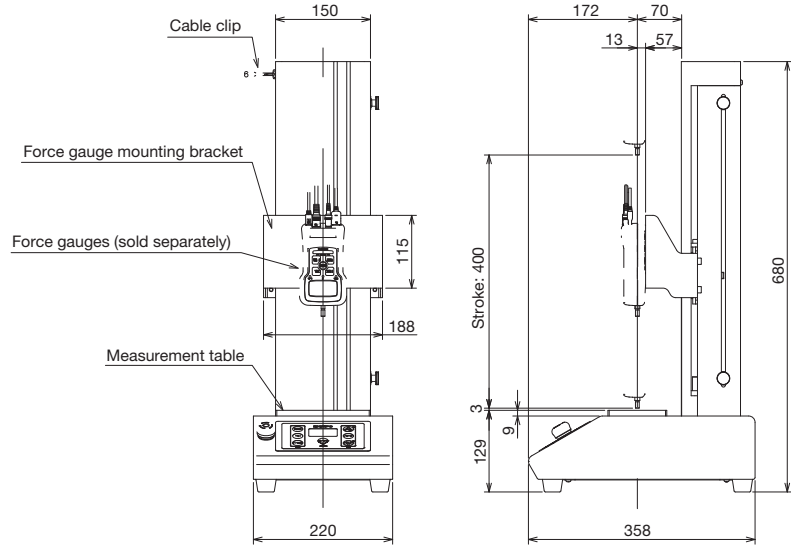
Input power supply covers the wide range of AC100 to 240V

Model	Maximum load
FGS-50E-L	500N
FGS-50E-H	

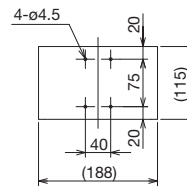
Supported models	
FGS-50E-L	FGS-50E-H
FGJN-2 to 50	
FGP-0.2 to 50	
FGPX-0.2 to 50	

Dimensional drawing

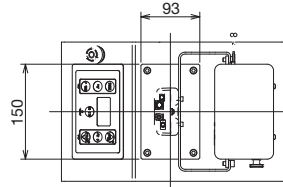
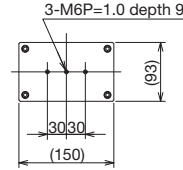
(mm)



■ Detailed force gauge mounting bracket parts



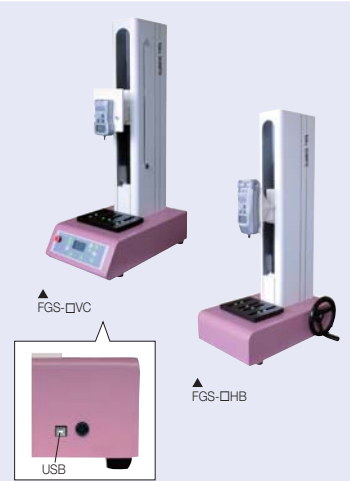
■ Detailed measurement table



Specifications

Model	FGS-50E-L	FGS-50E-H
	Low Speed Specifications	High Speed Specifications
Measurement load	500N	
Endurance load	500N	
Forward speed	6 to 180mm/min	20 to 600mm/min
Speed setting	Sets the speed using the operation panel	
Stroke	400mm	
Flexural rigidity	±0.5mm (distance between the gauge tip and table) when the maximum load is applied	
Display parts	3-digit LCD Indicates movement speed and action mode	
Display	Movement speed	6 to 180mm/min
	Action mode	Manual (MANU)/Jogging (JOG)/1 cycle (SIG)/Return repetition (CON)
Input	Overload input	
	Stops by FGXP (FGP) overload signal	
Measurement table	93×150mm	
Operating temperature range	0 to 45°C (No condensation)	
Power	AC100V to AC230V±10%	
Weight	Approx. 20kg	
External dimensions	220×680×358mm	
Accessories	1 connection cable, 1 power cable, 1 cable clip. Socket bolts (4 M4x8 bolts for force gauge mounting, 2 M6x12 bolts for jig mounting), 1 allen key spanner for M6, 1 for M4	

Force Gauge Stands (Motorized/Manual)



Motorized Test Stands for Force Gauges (Vertical Type) FGS-100VC/250VC Handle Style Force Gauge Stands (Vertical Type) FGS-100HB/250HB

Extends the range of "force" measurement

Adds the motorized and handle types to the vertical type stands.
Actualizes high accuracy measurement in a wider range of application.
Can install various force gauges.

FGS-VC

- Motorized
- USB
- Analog output
- Overload
- Digital display
- Supports length meter
- Program setting
- FGT-VC

Free downloads from website

Model	Maximum load
FGS-100VC	1000N
FGS-250VC	2500N

FGS-HB

Model	Maximum load
FGS-100HB	1000N
FGS-250HB	2500N

Common

- Can measure loads of 2N to 2500N (0.2kg to 250kg)

- Stroke: Movable to up to 400mm
- Measurement table: 150x200mm

FGS-VC

Data Import Software Specialized for FGS-VC FGT-VC

Simultaneously imports the stand movement distance and force gauge load data.

- Can measure loads of 2N to 2500N (0.2kg to 250kg)

Adopts LCD indication for the display panel

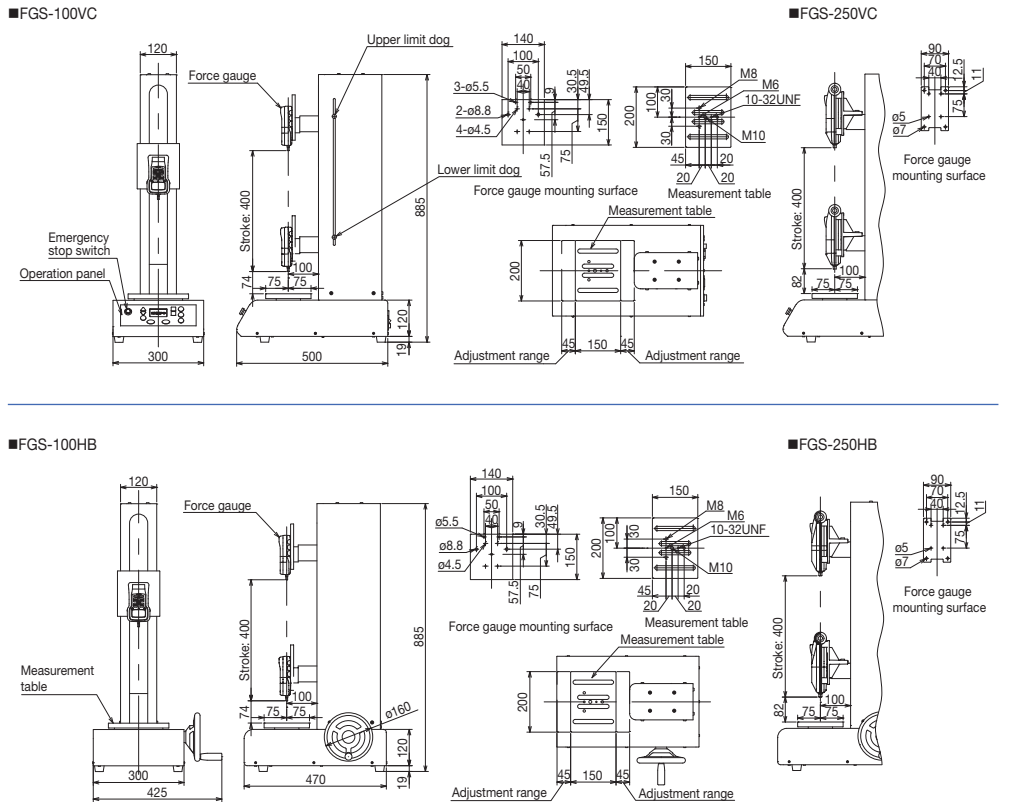
FGS-HB

- Enables minimal movement via handle operation

FGS-100HB: 1 handle rotation Approx. 1.33mm
FGS-250HB: 1 handle rotation Approx. 0.55mm

Supported models	
FGS-100VC FGS-100HB	FGS-250VC FGS-250HB
FGJN-2 to 50	FGJN-2 to 50
FGP-0.2 to 100	FGP-0.2 to 100
FGPX-0.2 to 100	FGPX-0.2 to 100
-	FGPX-250H

Dimensional drawing



Specifications

Model	FGS-100VC	FGS-250VC
Measurement load	1000N (100kg)	2500N (250kg)
Endurance load	1000N (100kg)	2500N (250kg)
Forward speed	10 to 400mm/min Sets the speed using the operation panel	
Stroke	400mm	
Flexural rigidity	±0.5mm (distance between the gauge tip and table) when the maximum load is applied	
Display parts	Dot matrix LCD Signed 4-digit	
Display	Movement speed display	10 to 400mm/min
	Movement distance display	0.0 to 400.0mm
	Repetition count display	0 to 9999
Action mode	MUNU mode: Movement towards dog/JOG mode: Jogging/SING mode: Rotational movement between dogs CONT mode: Repeating movement between dogs/PROG mode: 5 points position movement	
Communications	USB (for PCs)	
Input	Overload input Stops by FG PX(FGP) overload signal	
Measurement table	150x200mm	
Operating temperature range	0 to 45°C (No condensation)	
Power	AC100V±10%	
Weight	Approx. 63kg	Approx. 65kg
Accessories	Power cable, FG PX(FGP) connection cable, USB cable	
PC software	Specialized communication software (USB compatible) Free downloads from website Transmits load and distance data and indicates the graph/With trigger function (Starts data import when the specified load is attained) Can set the frequency of continuous data import/With upper and lower limits judgment function	
Others	Power AC socket for force gauges, emergency stop switch	
Supported force gauges	FGP-0.2 to 50,100 / FG PX-0.2 to 50,100	FGP-0.2 to 50,100 / FG PX-0.2 to 50,100 / FG PX-250H
Model	FGS-100HB	FGS-250HB
Measurement load	1000N (100kg)	2500N (250kg)
Endurance load	1000N (100kg)	2500N (250kg)
Stroke	400mm	
1 handle rotation	Approx. 1.33mm	Approx. 0.55mm
Measurement table	150x200mm	
Weight	Approx. 56kg	
Supported force gauges	FGN-0.2 to 50 / FGP-0.2 to 50,100 / FG PX-0.2 to 50,100	FGN-0.2 to 50 / FGP-0.2 to 50,100 / FG PX-0.2 to 50,100 / FG PX-250HB

Force Gauge Stands (Motorized/Manual)



Width 468 x Depth 234 x Height 206mm

Motorized (Horizontal Type) FGS-50XB-L (Low Speed Specifications) FGS-50XB-H (High Speed Specifications)

Horizontal specifications selected based on measurement environment

- Motored
- Analog output
- Overload
- Digital display
- Program setting
- Supports length meter

Free to select force gauge movements, such as jogging, or return repetition, according to measurement purposes and applications

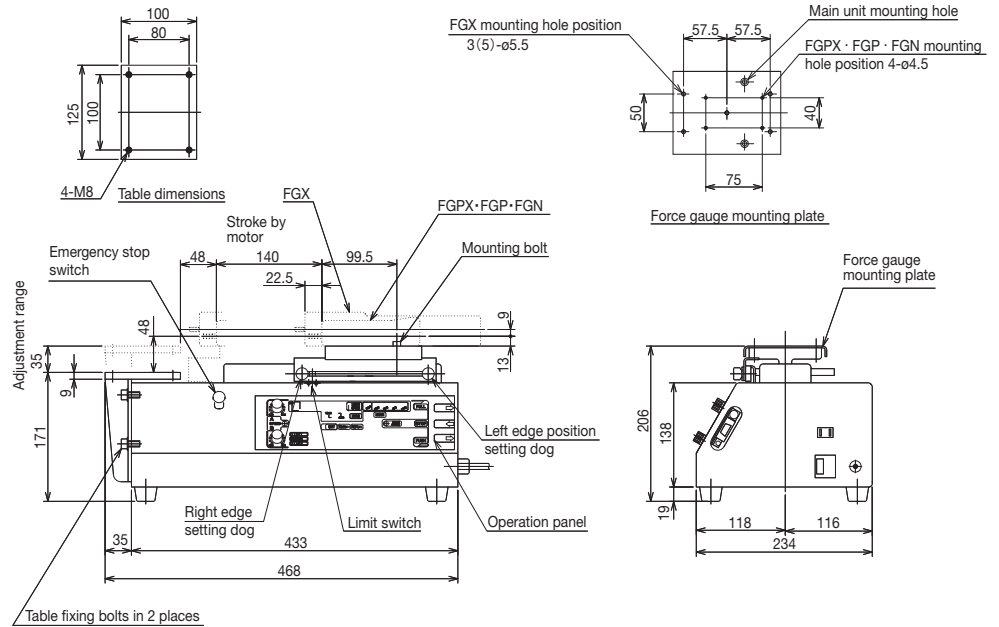
- **Stroke**
140mm
- **Forward speed**
For low speed: 5 to 120mm/min
For high speed: 20 to 500mm/min
- **Measurement table**
100x125mm

Model	Maximum load
FGS-50XB-L,H	500.0N(50kg)

Supported models	
FGS-50XB-L	FGS-50XB-H
FGJN-2 to 50	
FGP-0.2 to 100	
FGPX-0.2 to 100	

Dimensional drawing

(mm)



Width 230 x Depth 290 x Height 562mm

Manual Handle Type FGS-50H

Enables minimal movement via handle operation

- Manual
- Supports length meter

Can measure loads of up to 500.0N
Height adjustment in 6 levels every 30mm

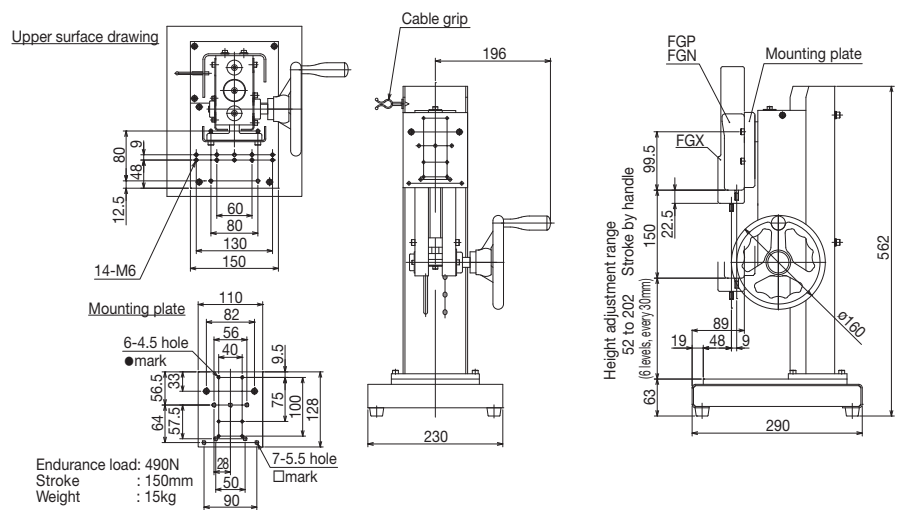
- **Stroke**
150mm
- **Measurement table**
150x145mm
- **1 handle rotation**
Approx. 3mm

Model	Maximum load
FGS-50H	500.0N(50kg)

Supported models	
FGJN-2 to 50	FGP-0.2 to 100
FGPX-0.2 to 100	

Dimensional drawing

(mm)



Specifications

Endurance load	500.0N
Height slide adjustment	6 levels every 30mm
Stroke	150mm
Jog mounting hole	14-M6
Weight (main unit)	15kg

Force Gauge Stands (Manual)



Width 160 x Depth 240 x
Height 320mm

Manual Lever Type FGS-5S

The most convenient pressing
power test machine

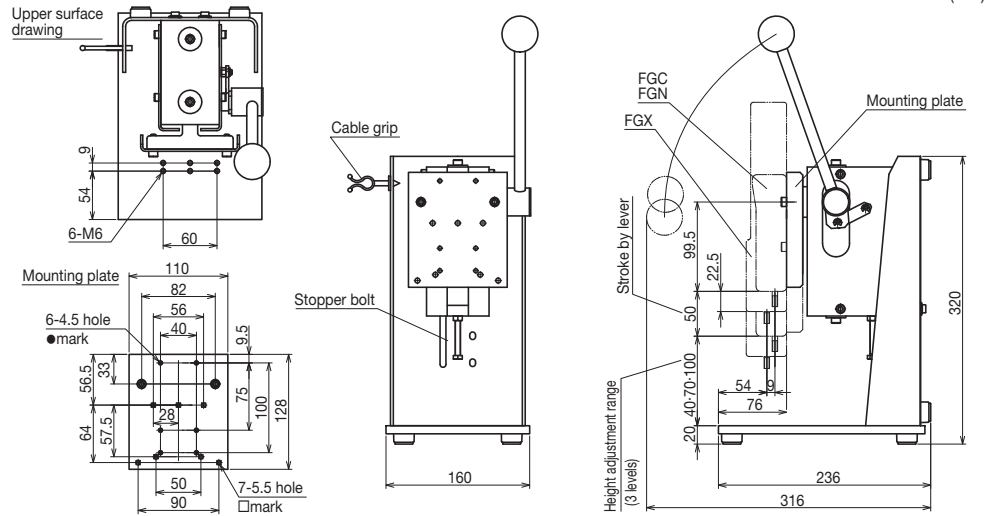
Manual Supports
leath meter

Can be used horizontally mounted
Can measure loads of up to 200.0N

- Stroke
50mm
- Measurement table
150x160mm

Model	Maximum load	Supported models
FGS-5S	200.0N(20kg)	FGJN-2 to 50
		FGP-0.2 to 100
		FGPX-0.2 to 100

Dimensional drawing



Specifications

Endurance load	200.0N
Height slide adjustment	3 levels every 30mm
Stroke	50mm
Jog mounting hole	6-M6
Weight (main unit)	10kg



Width 230 x Depth 290 x
Height 562mm

Manual Lever Type FGS-50L

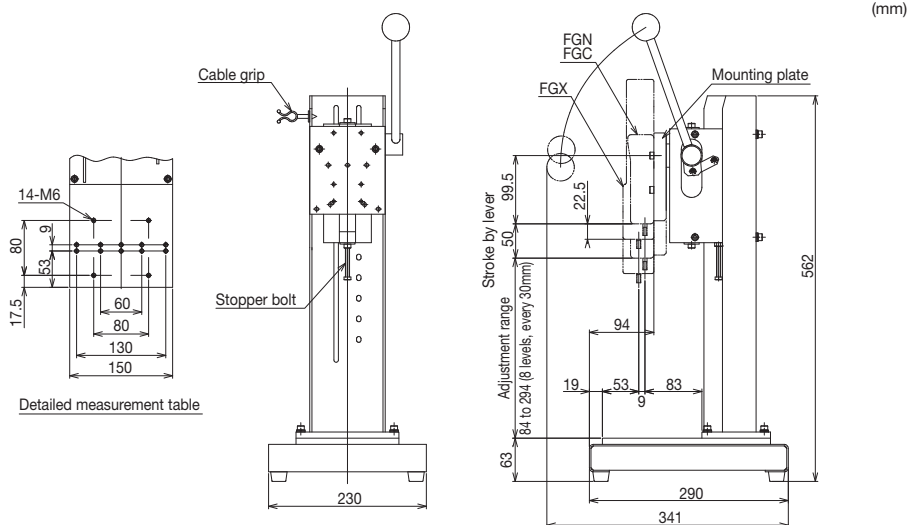
Lever type optimal for speedy
measurement

Can measure loads of up to 500.0N
Height adjustment in 8 levels every 30mm

- Stroke
50mm
- Measurement table
150x145mm

Model	Maximum load	Supported models
FGS-50L	500.0N(50kg)	FGJN-2 to 50
		FGP-0.2 to 100
		FGPX-0.2 to 100

Dimensional drawing



Specifications

Endurance load	500.0N
Height slide adjustment	8 levels every 30mm
Stroke	50mm
Jog mounting hole	14-M6
Weight (main unit)	15kg

Compact Desktop Test Stands



Compact Desktop Test Stands
FGS-TV/FGS-5000TV

Delivers extensive performance as a test machine

Motored USB Analog output Overload Digital display
Program setting FGT-TV/FGT-5kTV Accessories

Compact desktop test stands with high-performance, advanced functions, combining digital force gauge, motor stand, and exclusive add-in software "FGT-TV" into one set.

*Digital force gauges that are not included in a set are sold separately.

Equipped with various measurement modes as standard:

- Compression/Tension tests
- Peel tests
- Destruction tests
- Force detection tests
- Reciprocating tests

● Built-in USB port. Can import data by connecting to a PC USB port, and also perform various operations, such as start, end, and action selection from a PC.

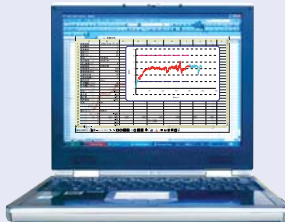
Data Import Software
Specialized for FGS-TV

FGT-TV FGT-TV

FGT-5kTV FGT-5kTV

Specialized software attached. Can import loads and variation data, and display in graphs. Directly imports data into Excel.

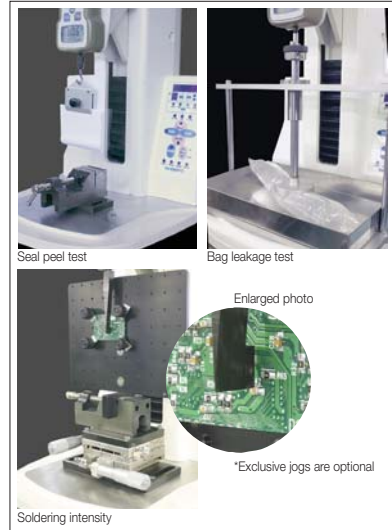
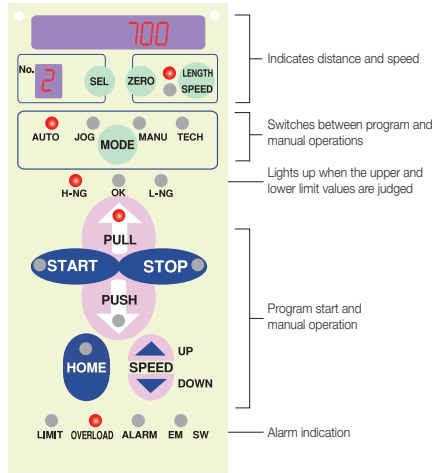
Displays peel force changes using the specialized software on a PC (image example)



USB cable attached

● Fully equipped with useful functions for tests

Key panel with excellent operation performance.

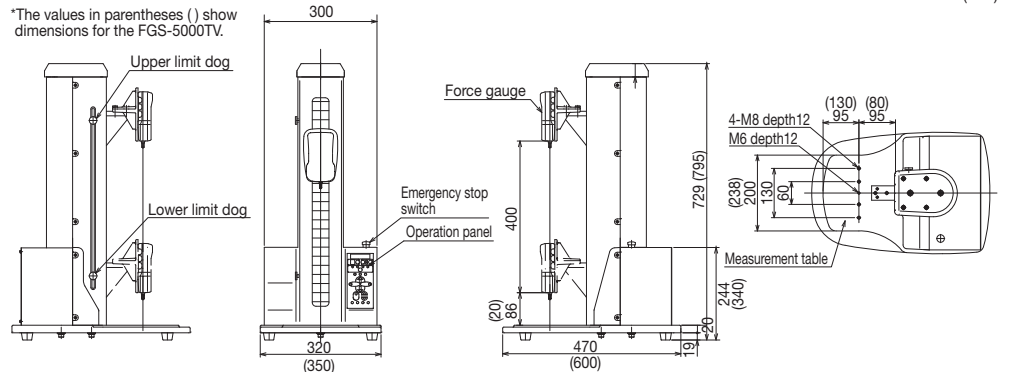


Model	Maximum load ^(Note 1)	Supported models
FGS-□TV	1000N(100kg)	FGP/FGPX-0.2 to 100
FGS-5000TV	5000N(500kg)	FGP/FGPX-0.2~100 FGPX-250H,500H

Note 1) Load values that can actually be measured are up to the rated capacity of the FGP/FGPX to be mounted.

Dimensional drawing

*The values in parentheses () show dimensions for the FGS-5000TV.












Specifications

Model	FGS-□TV	FGS-5000TV
Endurance load	1000N ^{Note 1)}	5000N ^{Note 1)}
Forward speed	1 to 700mm/min	1 to 500mm/min
Stroke	400mm	
Flexural rigidity	±0.5mm (distance between the gauge tip and table) when the maximum load is applied	
Operation	Can operate using the front panel	
	PC software	Can set and operate using the specialized software "FGT-TV" Can set and operate using the specialized software "FGT-5kTV"
Display	Movement speed display	1 to 700mm/min 1 to 500mm/min
	Movement distance display	0.0 to 400.0mm
Data import cycle	Can import 100 sets of load and distance data for max. 1 second.	
Overload input	Stops by force gauge overload signal	
Communications	USB1.0	
Operation	AUTO mode: Performs various test operations specified by PC software/JOG mode: Jogging operation available/MANU mode: Operation to the limit dog position available	
Measurement table	200×190mm	238×210
Operating temperature range	0 to 45°C (No condensation)	
Power	AC100V ±10% 2.5A	
Weight	35kg	110kg
Accessories	USB cable: 1.8m	

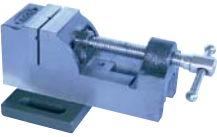
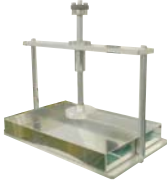


Note 1) Load values that can actually be measured are up to the rated capacity of the FGP/FGPX to be mounted.
*FGS-□TV is supplied as one set from the digital force gauge, motor stand, and measurement software. *Exclusive jogs are optional.






Exclusive Jogs (optional)






One touch film chuck		Wedge chuck		Pantograph chuck		Flat chuck		Fine point chuck	
									
Model	FGTT-20-20	Model	FGTT-532	Model	FGTT-21	Model	FGTT-533	Model	FGTT-22-M6
Width	20mm	Open width	0 to 5mm	Open width	15mm	Open width	35mm	Maximum open width	0.5mm
Open width	0 to 2mm								
Weight	100g	Weight	1.5kg	Weight	200g	Weight	1.5kg	Weight	30g
Allowable load	200N	Allowable load	5000N	Allowable load	500N	Allowable load	5000N	Allowable load	100N






Cam chuck		Oblique chuck		Roulette cam type attachment					
									
Model	FGTT-23	Model	FGTT-523	Model	FGTT-24	Model	FGTT-27	Model	FGTT-26
Sample width	30mm	Sample width	50mm	Open width	1mm	Open width	10mm	Open width	4.0mm
Sample thickness	2mm	Sample thickness	4mm						
Weight	200g	Weight	1.0kg	Weight	100g	Weight	1.0kg	Weight	150g
Allowable load	500N	Allowable load	2000N	Allowable load	100N	Allowable load	1000N	Allowable load	250N





Rotation type crimped terminal catching attachment		Hook for corrugated paper sealing intensity		Wire clamp jig		Both vice jig		T-groove surface plate	
									
Model	FGTT-28	Model	FGTT-29	Model	FGTT-25	Model	FGTT-30	Model	FGTT-31
Slit	12	Hook width	60mm	Open width	5mm	Width	70mm	Groove length	150mm
Weight	500g	Weight	150g	Weight	500g	Weight	4.0kg	Weight	6.0kg
Allowable load	1000N	Allowable load	250N	Allowable load	500N	Allowable load	1000N	Allowable load	5000N

Vice jig		Leak test jig		Solder test jig		Bending jig			
									
Model	GT-30-1	Model	FGTT-09	Model	FGTT-10	Model	FGTT-32	Model	FGTT-531
Width	38mm	Stroke	110mm	Mounting plate dimensions	200x150mm	Sample width	50mm	Sample width	100mm
		Tray inner dimensions	266x172mm				XY table movement amount		12.5mm
Opening	39mm	Allowable load	500N	Allowable load	500N	Allowable load	500N	Allowable load	5000N

Pin chuck		Film chuck		Small chuck		Film chuck		Wedge chuck	
									
Model	(4PC-15) 6PC-15	Model	(4FC-20) 6FC-20	Model	(4SC-3) 6SC-3	Model	(4SC-8) 6SC-8	Model	GC-2-5
Diameter	ø1 to 1.5mm	Width	20mm	Width	3mm	Width	50mm	Width	8mm
	ø1 to 2mm		Opening		2mm		Opening		2mm
Weight	Approx. 14g	Weight	Approx. 75g	Weight	Approx. 25g	Weight	Approx. 26g	Weight	Approx. 150g / 420g
Weight	Approx. 14g	Weight	Approx. 75g	Weight	Approx. 25g	Weight	Approx. 26g	Weight	Approx. 200g
									Approx. 470g

Flat model chuck			Winding chuck			Round bar chuck			One-sided roller chuck			X-Y table	
													
Model	GC-10-2		Model	GC-40		Model	GC-20		Model	GC-60		Model	GT-20-3
Width	19mm		Width	ø10mm		Grip diameter	ø0.5 to 5mm		Width	32mm		Movement amount	±30mm
Diameter	20mm		Opening	ø0.5mm		Weight	Approx. 160g	Approx. 430g	Weight	Approx. 170g	Approx. 440g	Upper plate dimensions	90×90mm

90° peel jig			180° peel test jig			Chuck exclusive for peeling			Postcard peel jig (upper)			Postcard peel jig (lower)	
													
Model	FGTT-12		Model	FGTT-11		Model	FGTT-15		Model	FGTT-13-UP		Model	FGTT-13-DOWN
Test direction	Pulling		Test direction	Pulling		Grip width	0 to 2mm		Test direction	Pulling		Test direction	Pulling
Allowable load	500N		Allowable load	200N		Material	Aluminum		Allowable load	20N		Allowable load	20N
Weight	Approx. 3.4kg		Width	50mm		Endurance load	200N		Width	150mm		Width	160mm
			Open width	0 to 2mm		Weight	60g		Open width	1 to 1mm		Open width	0 to 1mm
			Weight	Upper side: Approx. 60g / Lower side: Approx. 1.3kg					Weight	Approx. 0.2kg		Weight	Approx. 1.7kg

Roller chuck			Steel pressing jig			Aluminum pressing jig			Stainless pressing jig		
											
Model	GC-65		Model	FGTT-14-SS40	FGTT-14SS60	Model	FGTT-14-AU40	FGTT-14-AU60	Model	FGTT-14-SUS5	FGTT-14-SUS10
Test direction	Pulling		Material	Steel		Material	Aluminum		Material	Stainless	
Allowable load	2500N		Test direction	Pushing		Test direction	Pushing		Test direction	Pushing	
Chuck width	80mm		Allowable load	1000N		Allowable load	1000N		Allowable load	1000N	
Open width	0 to 3mm		External diameter	ø40	ø60	External diameter	ø40	ø60	External diameter	ø5	ø10
Weight	Upper side: Approx. 590g / Lower side: Approx. 860g		Weight	Approx. 120g	Approx. 240g	Weight	Approx. 45g	Approx. 90g	Weight	Approx. 20g	Approx. 35g

Force gauge mounting side
 Stand mounting side

Supported models

FGPX-1 to FGPX-100
 FGP-1 to FGP-100
 FGJN-2 to 50
 The models in parentheses support FGPX-0.5 and FGP-0.5 or less.

For digital force gauges of 5N or less, the measurement adapter mounting bolt is M4.

- When using M4, select the models of measurement adapters shown in parentheses.
- For other models, M6 is applied.

For high load (M10), contact us.

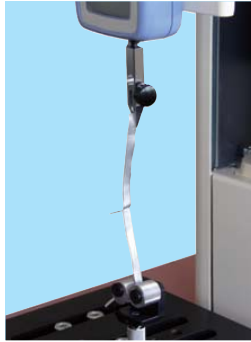
Besides the above items, customized jigs and test machines can be made upon request. For details, contact us.

Application

Force Gauge Stand Applications



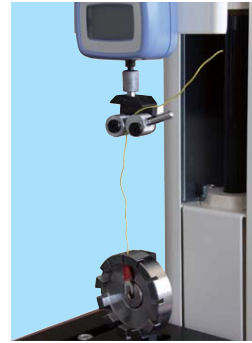
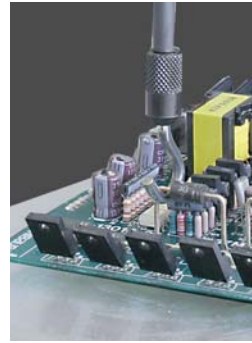
Bag seal opening force check



Straw pulling force



Soldering intensity



Crimp force check of crimped terminals



Rubber pulling force



Fiber pulling force



Plastic bag press force



Food stuff hardness

For various "force" measurements necessary for quality management



Sealed (lid) peel force

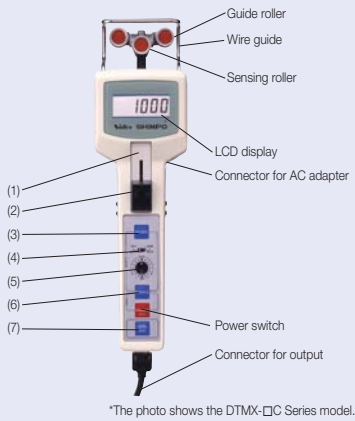


Wrapping adhesion peel force



Corrugated board bonding peel force

Digital Tension Meters



*The photo shows the DTMX-□C Series model.

Hand Held Model Digital Tension Meters High-Performance Type (with output) DTMX Series General purpose type (without output) DTMB Series

Applicable to high level measurement environments

The hand held model Digital Tension Meters that can be used in high level measurement environments, such as recording, statistics processing, and PC management

- Through RS-232C, digimatic output, and analog output, enables management of measurement values in PCs and printers (DTMX-□C Series)
- Can store up to 100 sets of measurement data in memory. In addition, enables automatic statistics processing of maximum/minimum values and average value by connecting to compatible printers
- Enables measurement of up to 5 wire types in one unit
(1) Thread (2) Steel wire (3) Copper wire, as well as 2 types of sample wires)
- Actualizes a high accuracy of $\pm 1\%$ R.C.
(DTMX-0.2C, 0.5C/DTMB-0.2C, 0.5C)
- Adopts an aluminum case that has resistance to impacts and static electricity

(1) DIP switch cover (DIP switch)

Set memory mode, display time, data output, and wire type

(2) Guide roller slide knob

Use when pinching the measuring wire (A supporting lever can be installed)

(3) Store switch

Use when storing data

(4) Wire type change switch

Select TEX (thread) or WIRE (steel, copper) based on the wire type

(5) Field adjustment switch

Increase/decrease, and correct the display value

(6) Recall switch

Use when recalling the maximum/minimum values, and memory data.

(7) Memory data output switch

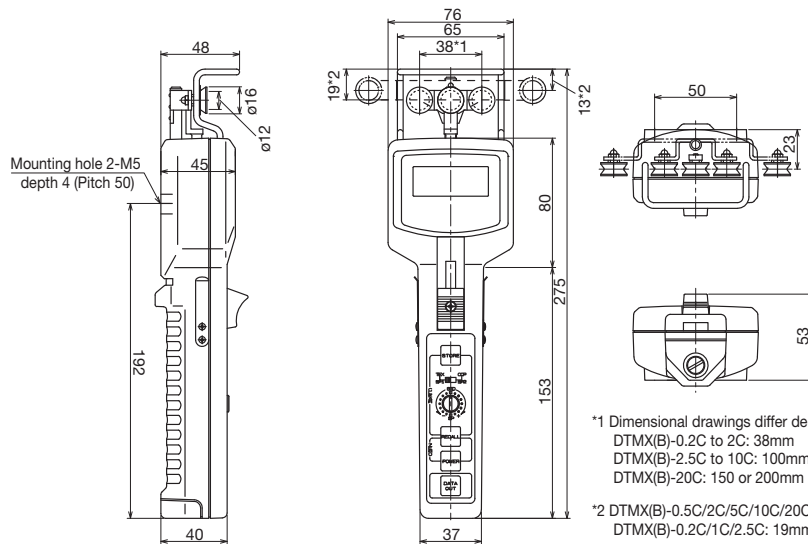
Output data when connecting to a PC or printer.

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		

Model	Maximum load	
DTMX-10C	9.81daN	10.00kg
DTMB-10C		
DTMX-20C	19.61daN	20.00kg
DTMB-20C		

Note that the standard calibration covers customer specified special wires.

Dimensional drawing



Specifications

Model	High-performance type (with output)	DTMX-0.2C	DTMX-0.5C	DTMX-1C	DTMX-2C	DTMX-2.5C	DTMX-5C	DTMX-10C	DTMX-20C
	General purpose type (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.) ^{Note 1)}		196.1cN (200.0g)	490.3cN (500.0g)	981cN (1000g)	1961cN (2000g)	2452cN (2500g)	4903cN (5000g)	9.81daN (10.00kg)	19.61daN (20.00kg)
Available display range		0.0 to 200.0cN	4.0 to 500.0cN	100 to 1000cN	200 to 2000cN	250 to 2500cN	500 to 5000cN	1.00 to 10.00daN	2.00 to 20.00daN
Measurement wire ^{Note 2)}	Thread	1000フィニール以下もしくはφ0.15以下	φ0.05 to φ0.25	φ0.1 to φ0.4	φ0.3 to φ0.7	φ0.3 to φ0.7	φ0.5 to φ1.2	φ0.7 to φ1.4	Performs special calibration if sample wires are provided by customers. ^{Note 3)}
	Steel wire	φ0.08 or less	φ0.01 to φ0.15	φ0.05 to φ0.25	φ0.15 to φ0.4	φ0.15 to φ0.4	φ0.3 to φ0.7	φ0.4 to φ0.8	
	Copper wire	φ0.15 or less	φ0.05 to φ0.25	φ0.1 to φ0.4	φ0.3 to φ0.6	φ0.3 to φ0.6	φ0.4 to φ1.0	φ0.7 to φ1.2	
Roller span		38mm			100mm			150mm - 200mm	
Roller		φ12, Hard coat aluminum							
Accuracy (when the measurement wire is static)		±1%R.C.			±1.5%R.C.				
Measurement time		0.5, 1, 2, and 4 seconds (selectable)							
Memory	DTMX-□C	Final measurement value, maximum value, minimum value, peak value, 100 sets of measurement data (memory backup using battery), statistics data ^{Note 5)}							
	DTMB-□C	Final measurement value, maximum value, minimum value, peak value							
Maximum speed ^{Note 4)}		1000m/min							
Field adjustment		Max. ±10.5% of reading/±1.5% per notch							
Display		4-digit LCD Font height: 11.5mm							
Output signal (DTMX-□C)	Analog output	0 to 1VDC (for available display range), D/A output, conversion time approx. 16msec Resolution capacity 3000 Load resistance 2kΩ or more							
	Digital output	RS-232C or Digimatic (selectable)							
Operating temperature/humidity		0 to 45°C/ 90%RH or less							
Power		AA dry cell battery x 4 (continuous use for approx. 20 hours using alkali battery), or AC adapter (optional)							
Dimensions	Outer shape	Width 76 x Thickness 48 x Length 257mm							
	Wire guide	Width 65mm							
Weight		Approx. 650kg			Approx. 700g				
Accessories		AA dry cell battery x 4, carrying case							
Application examples (excluding standard measurement wires)		•Flexible thread •Gold and silver threads of φ0.15 or less •Coated optical fiber •Synthetic fiber winder	•Optical fiber •Optical fiber gathering machine •Carbon fiber •Copper winder •Steel wire gathering machine	•Aramid fiber •Film for condensers •Food film •Brass wire of φ0.3 or less •Copper winder •Magnetic tape	•Carbon fiber •Steel wire of φ0.1 or less •Copper foil for electric wires (width 20 x 0.1t) •Tire code	•Material that particularly requires a small bending angle •Steel wire for office automation (copy machines, and printers, etc.)	•Carbon fiber •Measuring tape (10mm wide x 0.05t)	•Tungsten wire of φ0.8 or less •Flat or timing belt of 15mm or less in width	•Customer's sample wire

Note 1) R.C.=RATED CAPACITY

Note 2) Our standard calibration wires are as follows:

Thread: Nylon string, Steel wire: SUS304 (Hardness Hv531 to 541), Copper wire: Tinning soft copper wire (Hardness Hv69 to 82)

If measurement objects are subject to vibration, or the material may change, such as with rubber, we cannot guarantee the display accuracy. Contact us in advance.

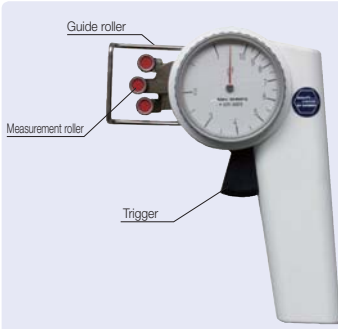
Note 3) Some wire materials cannot be accepted. Contact us in advance.

Note 4) We cannot guarantee wear of the roller, influence on measurement wire (winding, etc.), or accuracy.

Note 5) Statistics data

Number of samples (DATA) : n
Maximum value (MAX) : Xmax
Minimum value (MIN) : Xmin
Average value (AVG) : $\sum Xi/n = \bar{x}$
Standard deviation (DEV) : $\sqrt{\sum (Xi-\bar{x})^2/n}$

Analog Tension Meters



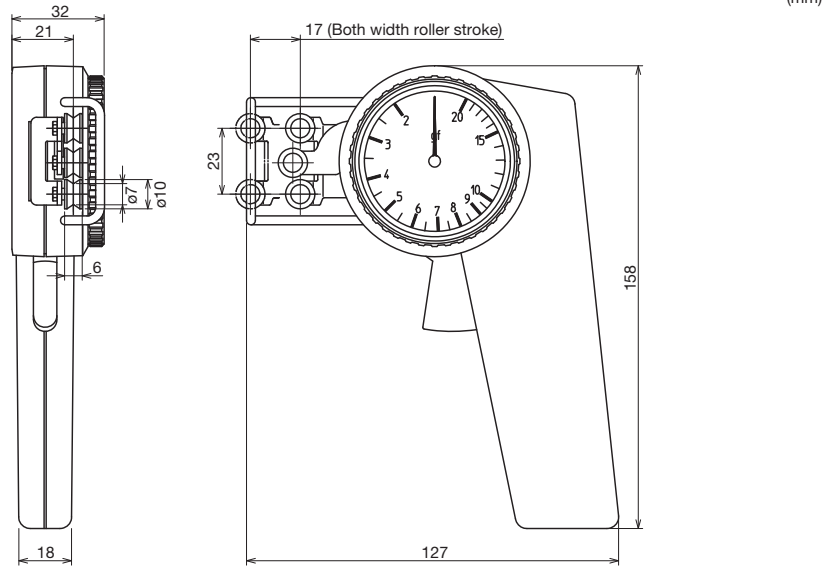
Hand Held Model for Low Tension Measurement Analog Tension Meters ZF2 Series

Analog tension meters capable of low tension measurement

- 6 types in the series cover from MAX.1 to 5cN for ultra-low tension to 100cN
- Simple measurement by just pressing the trigger and pinching the measurement wire between the measurement roller and guide roller
- Slim, measuring (230g), and compact design for operation performance

Model	Measurement range	
ZF2-5	1 to 5cN	1.020 to 5.099g
ZF2-10	1 to 10cN	1.020 to 10.20g
ZF2-20	2 to 20cN	2.039 to 20.39g
ZF2-30	3 to 30cN	3.059 to 30.59g
ZF2-50	5 to 50cN	5.099 to 50.99g
ZF2-100	10 to 100cN	10.20 to 102.0g

Dimensional drawing



Specifications

Model	ZF2-5	ZF2-10	ZF2-20	ZF2-30	ZF2-50	ZF2-100
Rated capacity (R.C.) ^{Note 1)}	1 to 5cN	1 to 10cN	2 to 20cN	3 to 30cN	5 to 50cN	10 to 100cN
	(1.020 to 5.099g)	(1.020 to 10.20g)	(2.039 to 20.39g)	(3.059 to 30.59g)	(5.099 to 50.99g)	(10.20 to 102.0g)
Measurement wire	Thread: $\phi 0.15\text{mm}$ or less					
Roller span	22mm					
Roller	Hard coat aluminum					
Accuracy	$\pm 1\%$ R.C. or ± 1 scale					
Speed ^{Note 2)}	MAX.900m/min					
Operating temperature	8 to 45°C					
Operating humidity	85% or less					
Casing material	Delrin					
External dimensions	Width 120 x Thickness 30 x Length 155mm					
Weight	Approx. 230kg					
Accessories	Carrying case					

Note 1) R.C. = RATED CAPACITY *We cannot guarantee wear of the roller, influence on measurement wire (winding, etc.), or accuracy.

Pulling/Pushing

Amplifier Built-in Model Load Cells

PLC Series

Amplifier Built-in Model Load Cells for High Load

VLC Series



PLC Series

- With +10V rated output, it can directly connect to the display, or programmable controller, etc.
- Overload protection device makes overload capacity twice as high as rated load
(PLC-100K's overload capacity tripled)
- Equipped with span, zero, and tare adjustments
- Simple connection Free built-in or stand-alone installation

VLC Series

- With +10V rated output, it can directly connect to the display, or programmable controller, etc.
- Compact design applied for built-in, stand-alone installation, and hanging with space saving
- Equipped with span, zero, and tare adjustments
- Simple connection

Model	Rated capacity (R.C.)	
PLC-0.2KD	$\pm 1.961\text{N}$	$\pm 200\text{g}$
PLC-0.5KD	$\pm 4.903\text{N}$	$\pm 500\text{g}$
PLC-1KD	$\pm 9.807\text{N}$	$\pm 1\text{kg}$
PLC-2KD	$\pm 19.61\text{N}$	$\pm 2\text{kg}$
PLC-5KD	$\pm 49.03\text{N}$	$\pm 5\text{kg}$
PLC-10KD	$\pm 98.07\text{N}$	$\pm 10\text{kg}$
PLC-20KD	$\pm 196.1\text{N}$	$\pm 20\text{kg}$
PLC-50KD	$\pm 490.3\text{N}$	$\pm 50\text{kg}$
PLS-100KD	$\pm 980.7\text{N}$	$\pm 100\text{kg}$

Model	Rated capacity (R.C.)	
VLC-200K	$\pm 2\text{kN}$	$\pm 203.9\text{kg}$
VLC-500K	$\pm 5\text{kN}$	$\pm 509.9\text{kg}$
VLC-1000K	$\pm 10\text{kN}$	$\pm 1020\text{kg}$

Tension Meters



Stand Alone Type Tension Meters for Tapes, Films, and Belts PLS-□K-□-□C Series

Tension detector for tapes, films, and belts, appropriate for control

●Applicable measurement objects

- Tapes (paper, cloth, plastic, wrap, porcelain)
- Films (for VTR, condenser)
- Non-threaded materials
- Metal foils

●The width of measurement objects should be equal to, or less than the roller width (10, 15, 20, 30mm), and 0.2 mm thick or less

●With +10V rated output, it can directly connect to control devices

●Easy to mount to various equipment/ devices

PLS-□K-□-□C
(1) (2) (3)

- (1) Rated tension
- (2) Bracket shape
- (3) Roller width

Model ²⁾	Rated tension	
PLS-0.2K-	1.961N	0.2kg
PLS-0.5K-	4.903N	0.5kg
PLS-1K-	9.807N	1kg
PLS-2K-	19.61N	2kg
PLS-5K-	49.03N	5kg
PLS-10K-	98.07N	10kg

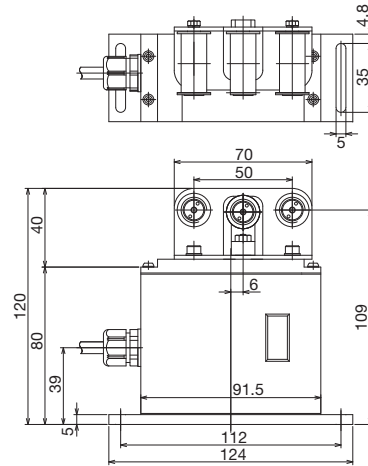
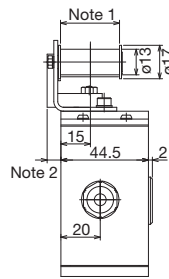
Sample wires are necessary for calibration

Dimensional drawing

PLS-□K-2-□C 0.2K to 2K

Roller width

Note 1)	Note 2)
10	0
15	0
20	2
30	7

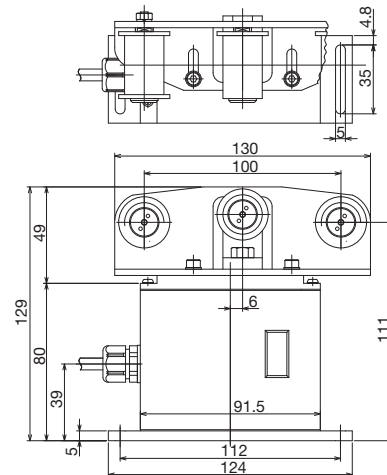
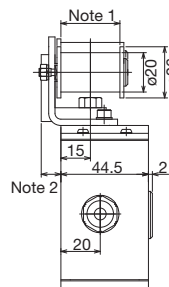


RollerMaterial : Stainless

PLS-□K-3-□C 5K to 10K

Roller width

Note 1)	Note 2)
10	1
15	3
20	5
30	10



RollerMaterial : Stainless

Specifications

Model	PLS-0.2K-	PLS-0.5K-	PLS-1K-	PLS-2K-	PLS-5K-	PLS-10K-
Rated capacity (R.C.) ^{Note 1)}	1.961N (0.2kgf)	4.903N (0.5kgf)	9.807N (1kgf)	19.61N (2kgf)	49.03N (5kgf)	98.07N (10kgf)
Measurement object ^{Note 2)}	The width should be equal to, or less than the roller width (10, 15, 20, 30mm), and 0.2 mm or less thick					
Wire speed (max.) ^{Note 3)}	300m/min					
Detection roller displacement	MAX. 0.3mm/in rated tension					
Roller shape	ø13mm cylinder roller Width: 10, 15, 20, 30mm				ø20mm cylinder roller	
Roller span	50mm				100mm	
Measurement accuracy (when the measurement wire is static) ^{Note 4)}	±1%/R.O.					
Overload capacity	200%/R.C.					
Rated output (R.O.) ^{Note 5)}	DC10V					
Input power supply	DC12V (10.5 to 15.5v) 0.15A DC5V or DC24V available, if specified					
Cable length	2m					
Weight	Approx. 630g				1kg	
Protection structure	IP52					

Note 1) R.C.=RATED CAPACITY

Note 2) Our standard calibration wires are as follows: Without sample wires, one of the specified types will be used.

Thread: Nylon wire, Steel wire: SUS304 (Hardness Hv531 to 541), Copper wire: Tinning soft copper wire (Hardness Hv69 to 82)

Note 3) We cannot guarantee wear of the roller, influence on measurement wire (winding, etc.), and accuracy.

Note 4) We may not guarantee accuracy depending on measurement object properties. Contact us in advance.

Note 5) It may change depending on measurement object properties.



Stand Alone Type General Purpose Tension Meters PLS-□K-□-□B Series

High accuracy tension detector
appropriate for control

●Applicable measurement objects

- Nylon wire
- Piano wire
- Copper wire
- Steel wire
- Electric wire
- Thread
- Stainless wire
- Gold, silver threads
- Plastic wire
- Communication wire
- Flexible wire

●With +10V rated output, it can directly connect to control devices

●Easy to mount to various equipment/ devices

PLS-□K-□-□B

(1) (2) (3)

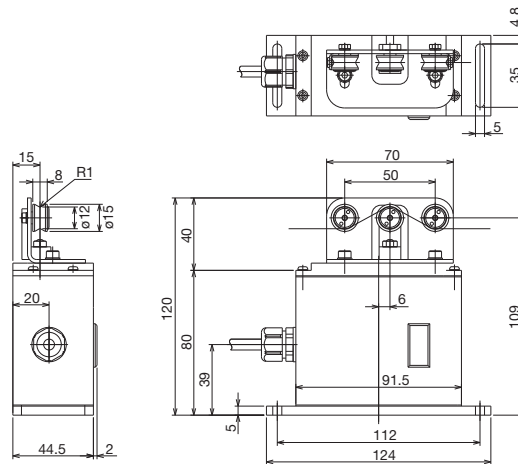
- (1) Rated tension
- (2) Bracket shape
- (3) Roller diameter

Model ^{1,2}	Rated tension	
PLS-0.2K-	1.961N	0.2kg
PLS-0.5K-	4.903N	0.5kg
PLS-1K-	9.807N	1kg
PLS-2K-	19.61N	2kg
PLS-5K-	49.03N	5kg
PLS-10K-	98.07N	10kg

Sample wires are necessary for calibration

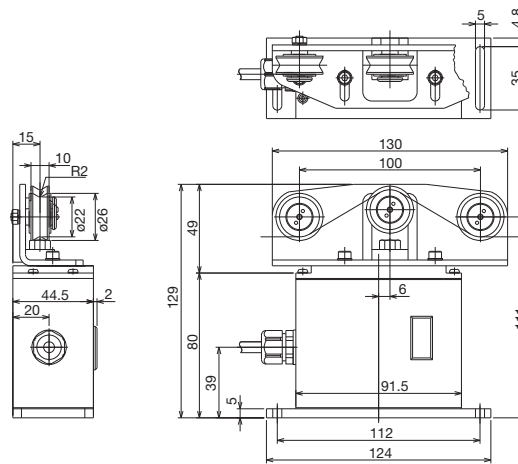
Dimensional drawing

PLS-□K-2-12B
(0.2 to 2K)



Roller material:
Hard coat aluminum

PLS-□K-3□22B
(5K to 10K)



Roller material:
Stainless (soft nitriding)

*1 We cannot guarantee wear of the roller, influence on measurement wire (winding, etc.), and accuracy.

*2 For information about 20K, 50K, and 100K, contact us.

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

Specifications

Model	PLS-0.2K-	PLS-0.5K-	PLS-1K-	PLS-2K-	PLS-5K-	PLS-10K-
Rated capacity (R.C.) ^{Note 1)}	1.961N	4.903N	9.807N	19.61N	49.03N	98.07N
Measurement object ^{Note 2)}	Thread	ø0.15 or less	ø0.25 or less	ø0.4 or less	ø0.7 or less	ø1.4 or less
	Steel wire	ø0.08 or less	ø0.15 or less	ø0.25 or less	ø0.4 or less	ø0.8 or less
	Copper wire	ø0.15 or less	ø0.25 or less	ø0.4 or less	ø0.6 or less	ø1.0 or less
Wire speed (max.) ^{Note 3)}	1000m/min					
Detection roller displacement	MAX. 0.3mm/At rated capacity (R.C.)					
Roller shape	ø12mm V-groove roller			ø22mm V-groove roller		
Roller span	50mm			100mm		
Rated output (R.O.) ^{Note 4)}	DC10V					
Measurement accuracy (when the measurement wire is static) ^{Note 5)}	±1%/R.O.					
Allowable overload	200%/R.C.					
Input power supply	DC12V(10.5 to 15.5V)/0.15A DC5V or DC24V available, if specified					
Weight	Approx. 630g				1kg	
Protection structure	IP52					

Note 1) R.C.=RATED CAPACITY

Note 2) Our standard calibration wires are as follows: Without sample wires, one of the specified types will be used.

Thread: Nylon wire, Steel wire: SUS304 (Hardness Hv531 to 541),

Copper wire: Tinning soft copper wire (Hardness Hv69 to 82)

Note 3) We cannot guarantee wear of the roller, influence on measurement wire (winding, etc.), and accuracy.

Note 4) It may not be possible to guarantee accuracy depending on measurement object properties. Contact us in advance.

Note 5) It may change depending on measurement object properties.

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Before using the product, please read through the instruction manual carefully and follow it for proper use.

