

Force Tensiometer

Tensio®

Specifications



Product group specifications

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Force measurement	standard force sensor	force sensor upgrade FS1101
Maximum load	250 g	210 g
Resolution	100 µg	1 µg
Accuracy	(plate method calibration) ±0.15 mN/m	
Measurement rate	100 Hz	
Adjustment	semi-automatic (optional)	automatic
Adjustment weight	external weight, 100 g	internal weight
Locking mechanism	automatic	
Sample stage		
Travel distance	120 mm	
Simple platform	optional	
Thermostat jacket	optional: 50 mm, 70 mm	
Vessel for inverse CMC	optional: cone-shaped vessel	
Integrated sample stage	yes	
Stirrer (optional)	induction – no permanent magnet	
Drive		
Resolution	16 nm	
Travel speed	0.001 to 800 mm/min	
Type of motor	brushless DC servo motor	
Optical height sensor (optional)		
Resolution	0.05 µm	

Product group specifications
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Software (all modules optional)	standard force sensor	force sensor upgrade FS1101
ADVANCE	surface tension (SFT)/interfacial tension (IFT) contact angle/surface free energy critical micelle concentration (CMC) liquid density solid density special purpose adhesion analysis sedimentation/penetration	

Software languages

Chinese (simplified), English, French, German, Japanese, Korean, Portuguese, Russian, Spanish

Measurement specifications
Tensíó

Du Noüy ring	standard force sensor	force sensor upgrade FS1101
Results	surface tension (SFT)/interfacial tension (IFT)/critical micelle concentration (CMC)	
Range	1 to 2000 mN/m	
Resolution	0.01 mN/m	0.001 mN/m
Correction methods	Harkins-Jordan, Huh-Mason, Zuidema-Waters, linear correction, no correction	
Rod method		
Results	SFT/IFT/CMC	
Range	1 to 2000 mN/m	
Resolution	0.2 mN/m	0.02 mN/m
Wilhelmy contact angle		
Minimum fiber diameter	fiber analysis not recommended	7 µm
Results	contact angle	
Range	0 to 180°	
Resolution	0.01°	
Type	advancing, receding	
Wilhelmy plate		
Results	SFT/IFT/CMC	
Range	1 to 2000 mN/m	
Resolution	0.02 mN/m	0.002 mN/m
Washburn		
Result	contact angle (CA)	
Range	0 to 90°	
Resolution	0.01°	
Type	advancing	
Surface free energy of solids		
Results	surface free energy, polar & disperse part, acid & base part, H-bond part	
Models	equation of state, Zisman, Fowkes, Wu, Owens-Wendt-Rabel-Kaelble, extended Fowkes, acid-base theory	
Liquid density		
Range	1 to 2200 kg/m ³	
Resolution	1 kg/m ³	0.1 kg/m ³

Measurement specifications		Tensífo	
		standard force sensor	force sensor upgrade FS1101
Solid density			
Range		1000 to 20000 kg/m ³	
Resolution		1 kg/m ³	0.1 kg/m ³
Sedimentation (with upgrade FS1101)			
Result		-	graph: mass vs. time
Penetration			
Result			graph: mass vs. time
General specifications		Tensífo	
		standard force sensor	force sensor upgrade FS1101
Temperature control (optional)			
Types		liquid	Peltier
Range		-10 to 130 °C	-15 to 135 °C
Temperature measurement (optional)			
Range			-60 to 450 °C
Resolution			0.01 °C
Precision			±0.05 °C
Accuracy			±0.5 °C
Internal sensor			sample stage
External sensor			optional: sample vessel
Housing and peripherals			
Built-in and software-controlled ionizer			optional
Built-in bubble level			electronic
Glass windshield doors			yes
Stainless steel measuring compartment			yes
Touch panel			integrated color IPS display (1024 × 600 pixel, size 7")
Environment			
Operating temperature			15 to 30 °C
Humidity			> 30% without condensation
Instrument dimensions			
Footprint			290 mm × 360 mm (W × D)
Height			560 mm
Weight (without accessories)			29 kg
Power supply			
Voltage (AC)			100 to 240 V
Power consumption			40 W
Frequency			47 to 63 Hz
Interfaces			
PC			USB 3.0
Auxiliary			CAN/CANopen
Thermostat			optional (quick couplings)
Inert gas			optional