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MSC Series
Digital Muscle Strength Comparator

Specification Sheet
SS-FM-3006-0904
September 2004

The CHATILLON® MSC Series is ideal for muscle strength testing, job task analysis and ergonomic evaluations. This compact, easy-to-use force gauge is designed for physical medicine, occupational medicine and sports medicine applications and general patient assessment in family, neurological and orthopedic practices. Simplicity was a key design criteria for both clinicians and technicians. Measurement accuracy is better than 0.1% full scale. A large, easy-to-read, high resolution dot matrix LCD display supports a variety of measurements including normal and peak readings, dominant v. non-dominant comparisons, pass/fail results, statistical results, load averaging, load comparisons, measurement actuation and direction. Measurements are displayed in ozf, gf, lbf, kgf and N units. The display can be inverted and displayed results may be "hidden" from the patient during testing. The MSC gauge comes standard with carrying case, battery adapter/charger and NIST Certificate of Calibration with data. A variety of testing fixtures are optionally available. The MSC is designated by the Food and Drug Administration (FDA) as a Class 2 medical device.

Features

- ❑ FDA Class II Medical Device
- ❑ Advanced Operating Modes
  - Normal
  - Peak Tension and Compression
  - Muscle Strength Comparison
  - Functional Capacity Evaluation
- ❑ Statistical Calculations
  - Mean with Maximum and Minimum Values
  - Coefficent of Variation with Mean and Standard Deviation
  - Standard Deviation with Variance and Mean
  - % Differentiation
- ❑ Integral Loadcells
  - Accuracy ±0.1% Full Scale
  - Mechanical Overload Protection to 150% Full Scale
- ❑ Simple Operator Interface
  - High Resolution Dot-Matrix
  - Menus with Prompts for Easy Use
  - Dedicated and Function Keys with Navigation Pod
- ❑ NIST Calibration with Data
  - Available IEC/ISO17025 Cert with Uncertainty
- ❑ 2 Year Warranty

Muscle Strength

Functional Capacity

Job Task Analysis

ADA Compliance

Chatillon®
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Because You Expect More from a Chatillon® Gauge...

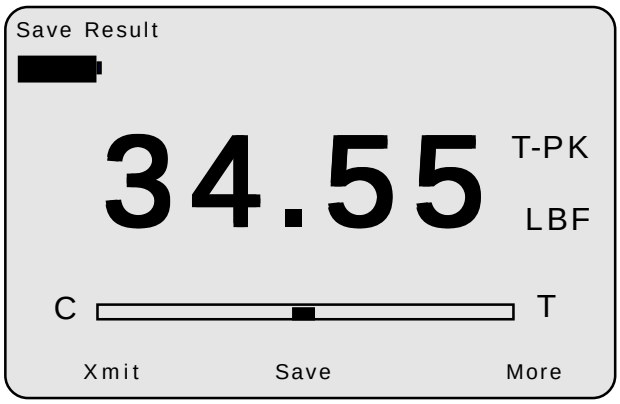
Physical Medicine
Use the Chatillon FCE to accurately measure and document musculoskeletal strength. Evaluate individual muscle groups in flexion/extension, internal/external rotation, plantar flexion, dorsi flexion and abduction/adduction.

Occupational Medicine
Conduct job task analysis, ergonomic analysis and functional capacity testing with the Chatillon MSC. Measure actual push, pull or lift forces to determine job task requirements. Then quantitatively evalute the subject's ability to perform those job tasks. Help ensure that a person is ready to assume work after an injury or test to ensure that an operation meets ADA compliance guidelines.

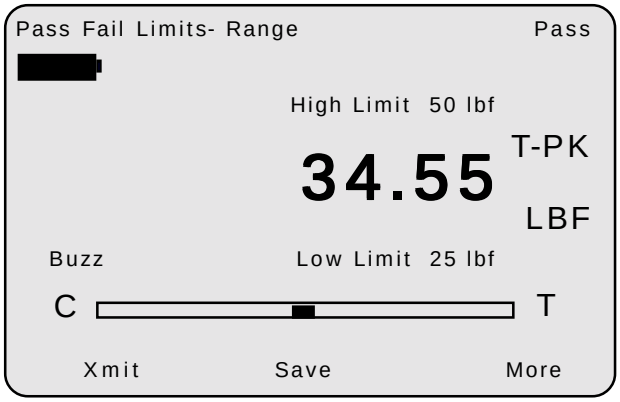
Sports Medicine
Objectively quantify an athlete's musculoskeletal force output. Evaluate and document the effectiveness of the training regiment and track the athlete's progress.

Class II Medical Device
The FCE has been classified by the Food and Drug Administration to be a Class II Medical Device.

Normal and Peak Modes
When used as a force measurement instrument, the FCE will display peak tension and compression loads. When in peak modes, the maximum force exerted during a test is displayed and may be stored for statistical comparisons or output to an external device using serial data communications. The size of the displayed information may be increased for easier viewing just by selecting a key on the keypad.



... You Get More from a Chatillon® Gauge.



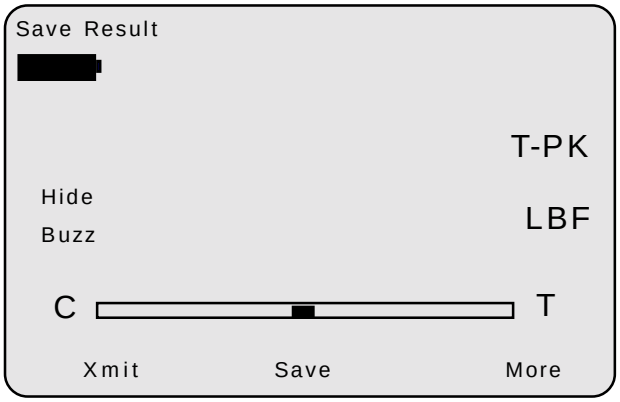
High & Low Load or Pass-Fail Limits

The MSC Series may be configured with High and Low Load Limits or Pass-Fail Limits. Load limits allow you to establish setpoints for your testing. If the gauge exceeds a setpoint value, the gauge can provide a visual and audible alarm. You can also setup the gauge to operate as a pass-fail system. You can setup a pass-fail limit based on a limit range or on a nominal value with a % bandwidth. Based on your setup, the gauge will provide you with a Pass-Fail indication.

Intuitive Operation

A large, easy-to-read dot matrix display contains can display up to 8 lines of information. The high resolution display features contrast adjustments and can be inverted when required. The display can even be "hidden" at the press of a button. A measurement bargraph indicates load and torque direction, measured load and torque and safe load and torque and helps prevent overloads. The sensors feature mechanical overload protection of 150% Full Scale.

The rubber keypad features dedicated and dynamic function keys. The function keys correspond to displayed options and guide the user during operation. A navigation pod lets you navigate in the menus and to scroll and change values quickly. The innovative "i" key can be used to display critical information on the gauge such as gauge capacity and resolution, battery life, loadcell overload history, even service information including last calibration date, or the location of service centers.

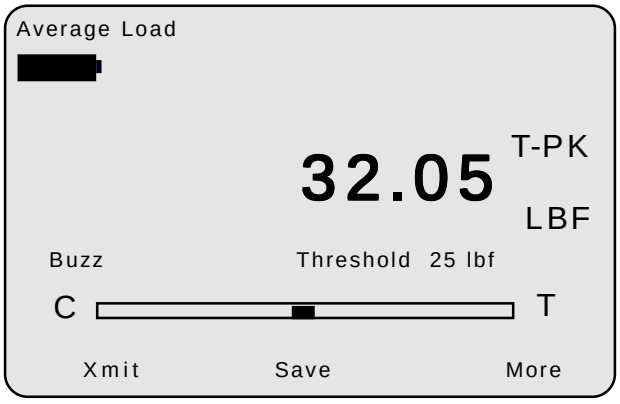


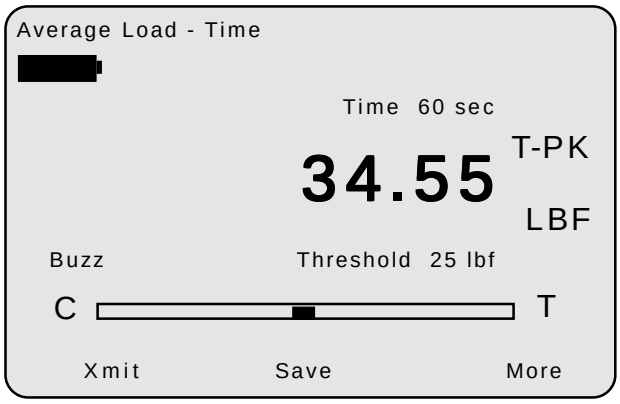
Functional Capacity Evaluation

Two methods of determining functional capacity are standard with your MSC. Functional capacity is useful to determine the functional stamina of a muscle group based on strength or time. It may be used to assess a subject's strength pre- and post conditioning or to evaluate a subject's strength after an injury.

Strength Method

This method allows you to define a strength threshold. The gauge will begin taking readings once the strength threshold has been reached and will continue to take and average readings until the measured strength value falls below the threshold value.





Time Method

The Time method allows you to establish your strength averaging based on a strength threshold and time duration. The strength threshold determines the start of the averaging, while the time duration defines the length of the test period. The gauge will begin taking readings when the threshold is reached and will continue to take and average readings until the time duration has expired.

Specifications

Accuracy: ±0.1% of full scale

Certification: Calibration with NIST Data, IEC/ISO17025 optional

Data Sampling Rate: 5000 Hz

Peak Capture Rate: 5000 Hz

Display Update Rate: 10 Hz

Tare Capacity: 10% full scale

Overload Protection: 150% full scale

Display Characteristics: High resolution, dot-matrix LCD, 8 lines, 40 characters, adjustable contrast, invert and "hide" capability

Automatic Shut Down: Configurable time. May be disabled.

Data Storage: 10 results, Optional NEXYGEN™ software for unlimited storage and automated testing and analysis

Outputs: RS-232, Mitutoyo (Digimatic) and ±2Vdc analog

Power: Battery or direct AC operation. Universal Power 110V/230V, Rechargeable Nickel Metal Hydride (supplied)

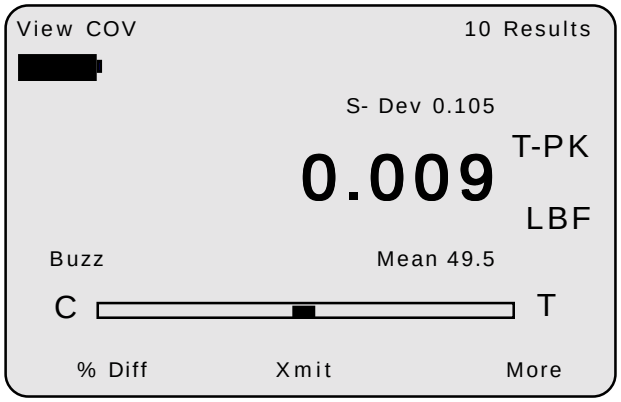
Battery Life: 30 Hrs. continuous use

Instrument Weight: 1.5 lbs (0.7 kg)

Operating Temperature: 40° to 100°F (4° to 38°C)

FDA Classification: Class II Medical Device

Warranty: 2 year



Statistical Results

You may save and store up to 10 results in instrument memory for later recall or to calculate statistical results when in Peak mode. The gauge labels each results and indicates memory capacity. The gauge will alert you when memory is full. Statistical results include:

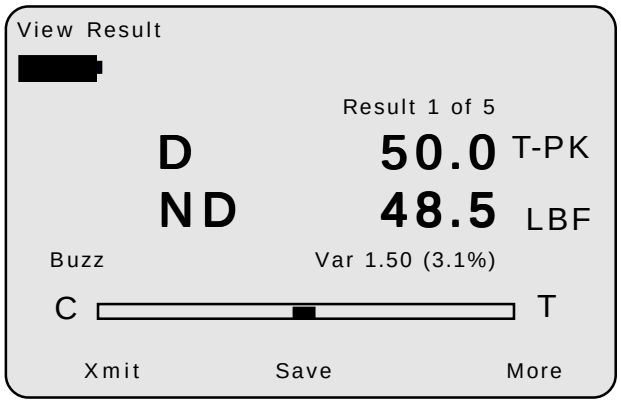
- Calculate Mean and also show you the MAX and MIN values for your calculation
- Coefficient of Variation is calculated and displayed with the Mean and Standard Deviation value
- Standard Deviation is calculated and displayed with the Mean and the Variance value. Total Population and Sample (n-1) methods supplied.
- Calculate and display % Difference between consecutive test results

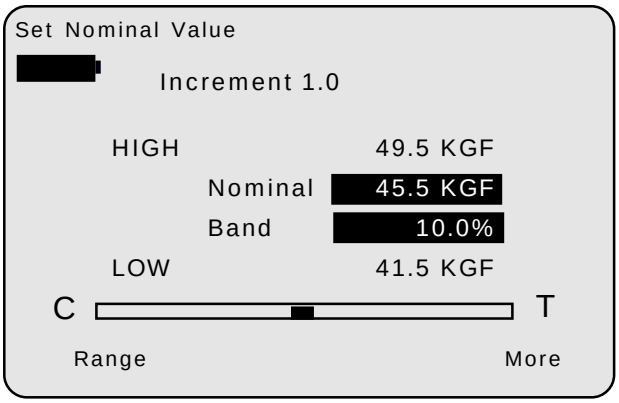
Simplified Setup

Menus and intelligent prompts make gauge setup fast and easy. Gauge options are presented in a "List Format". Using the navigation pod and function keys, you simply select the functions and parameters required. The gauge will guide the user through the setup process. Default settings are provided and a "Quick Reset" allows the user to re-establish defaults with a single key press.

Muscle Strength Comparisons

Compare muscle strength from a normal (dominant "D") muscle to an impared (non-dominant) "ND" muscle. The MSC allows you to perform 5 sets for the dominant and non-dominant muscle group and compare results statistically. Once the test is completed, you can review individual test data and compare results. Both sets of results are displayed simultaneously including the calculated variance and % difference (force variation). You may also calculate and display Mean, MIN and MAX results, Coefficient of Variation (COV) and Standard Deviation. Results may be transmitted to an external device using RS232 serial communications.





Ordering

Muscle Strength Comparator (Gauge Only)

Model	ozf	gf	lbf	kgf	N
MSC-100	1600 x 0.2	50,000 x 5	100 x 0.01	50 x 0.005	500 x 0.05
MSC-200	3200 x 0.4	-	200 x 0.02	100 x 0.01	1000 x 0.1
MSC-500	8000 x 1	-	500 x 0.05	250 x 0.02	2500 x 0.2

Note: Gauge is supplied with a 120V Charger and US Mains Plug. Use the following prefixes if you require a 230V Charger and a UK or EU Mains Plug.
-UK 230V UK Mains Plug (Example: MSC-100-UK)
-EU 230V EU Mains Plug (Example: MSC-100-EU)

Self Diagnostics

The MSC Series incorporates flash memory and hosts a set of self-diagnostic functions for monitoring the display, keypad and electronics. Using the "i" key, you have immediate access to battery conditions, including estimated battery life remaining. You can also view loadcell status, including the number of overloads that have been applied to the gauge. Zero offset verification is standard and a step-by-step calibration procedure is built-in allowing you to calibrate your MSC gauge with certified standards.

Muscle Strength Comparator Kit

Item	Capacity	Part No.	Included
Muscle Strength Analysis Kit		MSCK	Optional
Adapter, Notch 5/8"	100 lbf	NC000721	
Adapter, Notch 1"	500 lbf	NC000725	
Adapter, Rectangular 3.5"	250 lbf	NC000730-1	
Adapter, Rectangular 3/4"	250 lbf	NC000738-1	
Mushroom Fixture	250 lbf	NC000743-1	
Adapter, Circular Flat	250 lbf		
Hook, with Clasp	500 lbf	NC002500	
Extension Rod, 6"	100 lbf	SPK-FMG-013B	
Adapter, 1/2-20 to 5/16-18		17162	
Carrying Case		NC000793	

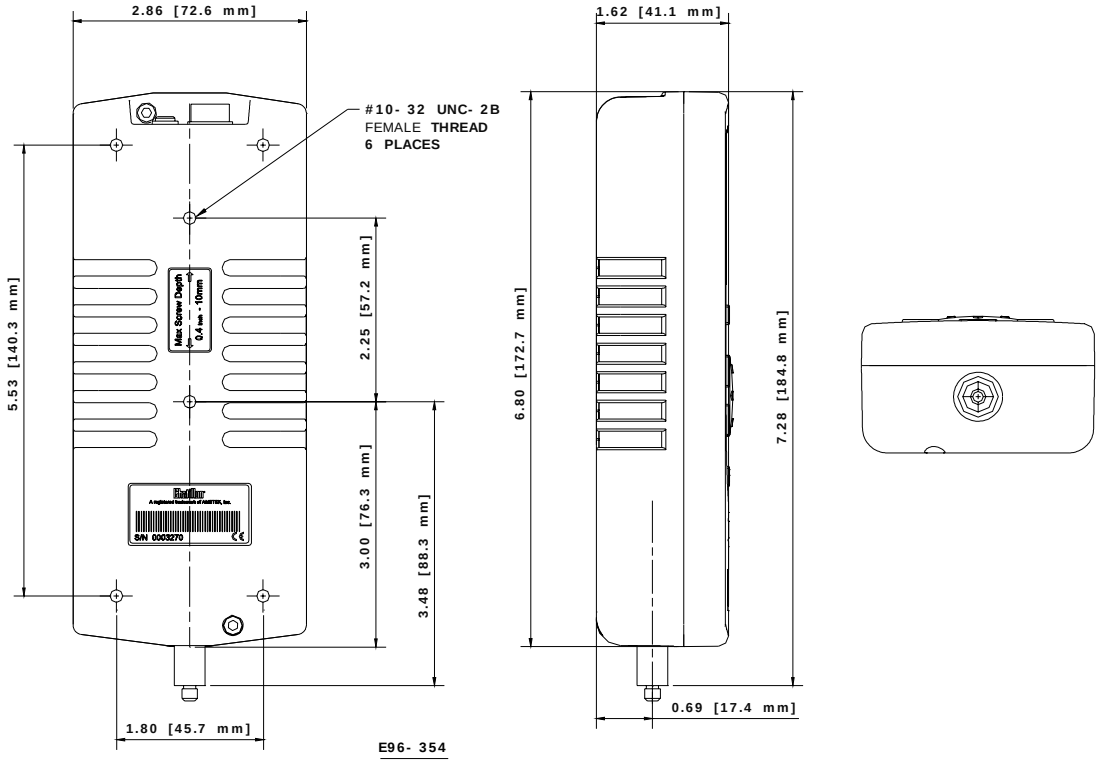
Note: You may order the entire kit or an individual component.

Functional Capacity Kit

Item	Capacity	Part No.	Included
Functional Capacity Kit		FCEK	Optional
Adapter, Circular Flat	250 lbf		
Curve Adapter	250 lbf		
Palm Adapter	250 lbf		
Notch Adapter, Large	500 lbf		
Pistol Grip	500 lbf		
Hook, with Clasp	250 lbf	NC000756	
Nylon Loop	500 lbf		
Knurled Nut		NC000857	
Fanny Pack			

Note: You may order the entire kit or an individual component.

Dimensions



Common Accessories

Item	Capacity	Part No.	Included
Carrying Case		SPK-FMG-130	Standard[1]
Battery Charger, 120V, US Mains Plug		SPK-DF-US	Standard[1]
Battery Charger, 230V, EU Mains Plug		SPK-DF-EU	Standard[1]
Battery Charger, 230V, UK Mains Plug		SPK-DF-UK	Standard[1]
Hook, Stationary	50 lbf (225 N)	SPK-FMG-012A	Optional
Hook, Stationary	100 lbf (500 N)	SPK-FMG-012B	Optional
Flat	100 lbf (500 N)	SPK-FMG-011A	Optional
Flat	500 lbf (2.5 kN)	SPK-FMG-011B	Optional
Hook, Stationary	500 lbf (2.5 kN)	SPK-FMG-012C	Optional
Extension Rod, 6-inch	100 lbf (500 N)	SPK-FMG-013A	Optional
Extension Rod, 6-inch	500 lbf (2.5 kN)	SPK-FMG-013B	Optional

Item	Capacity	Part No.	Included
Hook, Swivel	20 lbf (112 N)	ML3867	Optional
Hook, Swivel	100 lbf (500 N)	ML3850	Optional
Hook, Swivel	500 lbf (2.5 kN)	ML3868	Optional
Hook, Clasp	500 lbf (2.5 kN)	NC002500	Optional
Chisel Point	100 lbf (500 N)	SPK-FMG-008A	Optional
Chisel Point	500 lbf (2.5 kN)	SPK-FMG-008B	Optional
Point	100 lbf (500 N)	SPK-FMG-009A	Optional
Point	500 lbf (2.5 kN)	SPK-FMG-009B	Optional
Notch	100 lbf (500 N)	SPK-FMG-010A	Optional
Notch	500 lbf (500 N)	SPK-FMG-010B	Optional
Adapter, #10-32 to 5/16-18		P-10020	Optional

Note: [1] Accessories are Model dependent.
100 lbf (500 N) capacities and below use a #10-32 fitting
200 and 500 lbf (1 kN and 2.5 kN) capacities use a 5/16-18 fitting

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