

MSC Series Digital Muscle Strength Comparator

Specification Sheet
SS-FM-3006-0505
May 2005

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, 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 II medical device.

Features

- ❑ FDA Class II Medical Device
- ❑ Two Models
 - MSC Series (No Accessories)
 - K-MSC Series (Includes All Accessories)
- ❑ Advanced Operating Modes
 - Normal
 - Peak Tension and Compression
 - Muscle Strength Comparison
- ❑ Statistical Calculations
 - Mean with Maximum and Minimum Values
 - Coefficient of Variation with Mean and Standard Deviation
 - Standard Deviation with Variance and Mean
 - % Differentiation
- ❑ Integral Loadcells
 - Accuracy $\pm 0.1\%$ 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



You Get More with Your CHATILLON Gauge.



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

Physical Medicine

Use the Chatillon MSC 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

Measure actual push, pull or lift forces to determine job task requirements using the Chatillon MSC. Then quantitatively evaluate 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 regimen and track the athlete's progress.

Class II Medical Device

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



Applications

Ankle

Dorsiflexion
Plantar Flexion
Inversion
Eversion

Cervical

Extension
Flexion
Rotation
Lateral Rotation

Elbow

Extension
Flexion
Pronation
Supination

Hip

Abduction
Adduction
Extension
Extension Isolating Gluteal Muscles
Extension Using Gluteal and Hamsprings
External Rotation
Internal Rotation
Flexion

Knee

Extension
Flexion

Lumbar

Extension
Flexion
Rotation
Lateral Flexion

Shoulder

Adduction
Abduction Substituting Trapezius
Abduction Without Substitution
Adduction
Extension
Flexion
Rotation

Wrist

Extension
Flexion
Radial Deviation
Ulnar Deviation



The MSC Test Function with a Chatillon gauge...

Using Muscle Strength Comparison

The MSC Series digital dynamometer is a Class II medical device. This gauge features the MSC Method for assessing, evaluating and analyzing muscle strength. The MSC Method allows you to compare a dominant (unimpaired) muscle group to a non-dominant (impaired) muscle group. It can provide empirical data to assess muscle strength and rehabilitation progress compared to a dominant muscle group standard.

The MSC Method may be turned ON or OFF.

When the MSC Method is turned ON, the gauge will display the results of two test SETS (SET A and SET B).

What is a Batch?

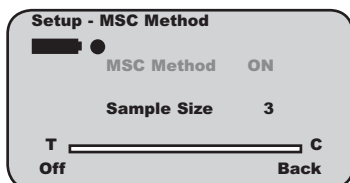
A Batch is the name of a completed test when using the MSC Method. A Batch represents all the required tests for SET A (dominant/unimpaired) and SET B (non-dominant/impaired) combined. For a Batch to be completed, the user must have measured and saved all required tests (based on the sample size) for SET A and SET B. A test is invalid if both SETS are not completed. The MSC Series dynamometer will not complete the statistics when a Batch is incomplete.

Specify Sample Size

The Sample Size represents the number of tests for both SET A and SET B that must be completed before a Batch is considered completed.

The Sample Size may be specified as 3, 4 or 5 tests.

Use the navigation keys to increment the size to the desired Sample Size number.



Keys used to increase the displayed count



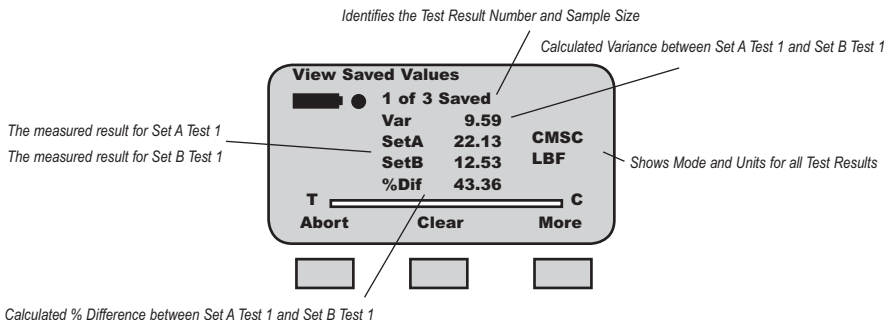
Keys used to decrease the displayed count

Set A, Test 1	Required
Set A, Test 2	Required
Set A, Test 3	Required
Set A, Test 4	Optional
Set A, Test 5	Optional
Set B, Test 1	Required
Set B, Test 2	Required
Set B, Test 3	Required
Set B, Test 4	Optional
Set B, Test 5	Optional

MSC Series
Memory Registers

Specifying Sample Size

The MSC Test requires that you perform a minimum of 3 tests for both Set A and Set B. The maximum number of tests may be specified as 5.



Calculated % Difference between Set A Test 1 and Set B Test 1

Performing a Batch

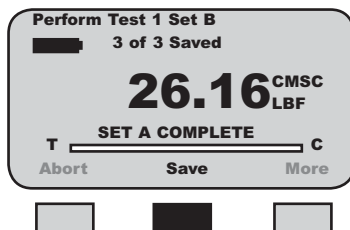
Once the MSC Series dynamometer has been configured with the MSC Method ON and sample size specified, you may now perform a Batch Test.

The Batch Test is the combination of completed tests for SET A and SET B. A Batch is considered complete when all tests for SET A and SET B have been measured and Saved into memory.

In practice, it is recommended that SET A represent the dominant/unimpaired muscle group. Use SET B to represent the non-dominant/impaired muscle group.

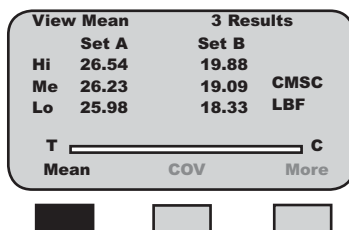
Step-by-Step Guides

Prompts are displayed by the dynamometer that guide you through the MSC test procedure. You use the F2 (Save) key to save results into memory. When the SET A results are completed, the gauge will indicate that "SET is COMPLETE". Once the Set B results are saved, the gauge will display "TEST COMPLETE". This will now enable you to make your comparisons and to print your test results for analysis.



Reviewing Statistics

After reviewing individual test results, you may view STATISTICS by selecting the F3 (More) key. The MSC Series will display Mean, Coefficient of Variation, % Difference and Standard Deviation for Set A and Set B results.



Printing Results

Once you have completed the MSC test procedure, you may transmit/print results using HyperTerminal. If you select F1 (Xmit-W) the gauge will transmit the displayed results. If you select F2 (XmitAll) you will print a comprehensive report with the following information:

Comprehensive Report Format						
Mode	Result	Set A	Set B	Diff	%Diff	Units
CMCS	1	25.98	18.33	7.65	29.44	lbf
CMCS	2	26.54	19.06	7.48	28.18	lbf
CMCS	3	26.16	19.88	6.28	24.00	lbf
MEAN		26.23	19.09			
COV		1.09	4.07			
S-DEV		0.29	0.78			
Variance		0.08	0.60			
%Diff						
1 v 2		2.16	3.99			
2 v 3		-1.43	4.32			
CoVar		0.0418				

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

Using Pass-Fail Limits

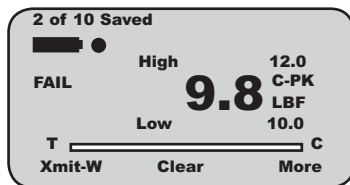
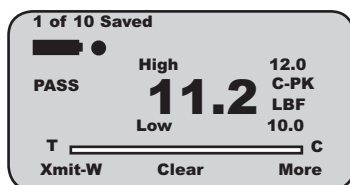
The MSC Series dynamometer allows you to setup PASS-FAIL LIMITS based on either a Range of values or on a Nominal Value. The "Pass/Fail" feature is useful when assessing a patient's ability to meet a strength criterion. You can set the strength requirement and measure the patient's ability to achieve that strength measurement. The MSC Series will display "PASS" or "FAIL" based on the measured results.

Pass-Fail Limit - Range

You may setup your MSC Series gauge to display a PASS or FAIL message based on whether or not the measured results falls within an upper and lower setpoint range. The gauge will display PASS or FAIL depending on how the measured result compares to the setpoint range.

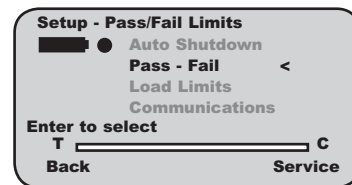
Pass-Fail Limit - Nominal Value

You may setup your MSC Series gauge to display a PASS or FAIL message based on whether or not the measured results falls within an upper and lower setpoint range calculated using a Nominal Value and % Bandwidth. The gauge will display PASS or FAIL depending on how the measured result compares to the setpoint range.



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.



Ordering



You may order the MSC as a Travel Kit. The K-MSC includes all accessories used in our MSCK and FCEK accessory kits. The Travel Kit includes the dynamometer, charger, handle assembly, accessories and a common carrying case.

Muscle Strength Comparator Travel Kit

Model	ozf	gf	lbf	kgf	N
K-MSC-100	1600 x 0.2	50,000 x 5	100 x 0.01	50 x 0.005	500 x 0.05
K-MSC-200	-	-	200 x 0.02	100 x 0.01	1000 x 0.1
K-MSC-500	-	-	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)

The standard MSC includes the dynamometer, charger, handle assembly, and carrying case.

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	-	-	200 x 0.02	100 x 0.01	1000 x 0.1
MSC-500	-	-	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)

Accessories



Muscle Strength Comparison Kit & Accessories (Optional)

Item	Capacity	Part No.	Included
MSC Kit		MSCK	Optional
Adapter, Notch 5/8"	100 lbf	NC000721	
Adapter, Notch 1"	500 lbf	NC000725	
Adapter, Rectangular 3.5"	250 lbf	SPK-FMG-145	
Adapter, Rectangular 3/4"	250 lbf	SPK-FMG-146	
Adapter, Curved Fixture	250 lbf	SPK-FMG-142	
Adapter, Palm Fixture	250 lbf	SPK-FMG-144	
Adapter, Flat Disc, 1/2"	250 lbf	SPK-FMG-143	
Grasping Cable with Loops	500 lbf	NC002844	
Hook, with Clasp	250 lbf	NC002500	
Extension Rod, 6-inch		SPK-FMG-013C	
Knurled Nut, 5/16-18		NC000857	
Carrying Case		SPK-FMG-147	

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

Common Accessories

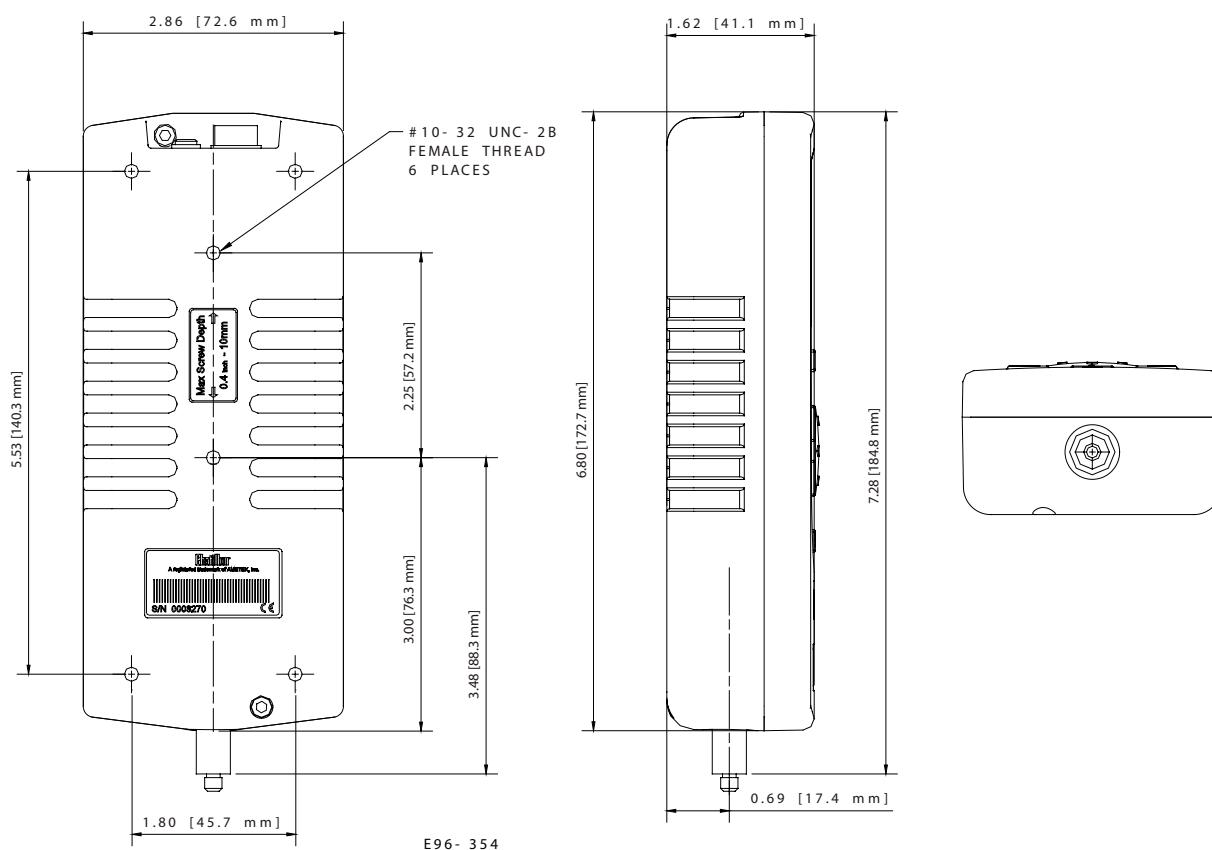
Item	Capacity	Part No.	Included
Carrying Case		SPK-DF-118	Standard ¹
Battery Charger, 120V, US Mains Plug		SPK-DF-US120	Standard ¹
Battery Charger, 230V, EU Mains Plug		SPK-DF-EU230	Standard ¹
Battery Charger, 230V, UK Mains Plug		SPK-DF-UK230	Standard ¹
Handle Assembly		SPK-DF-HANDLE	Standard
Hook, 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
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
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
Pistol Grip Assembly		SPK-FMG-141	Optional
RS232 Cable		SPK-DF-RS232	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

Dimensions



Specifications

Accuracy: $\pm 0.1\%$ 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), International Universal AC Adapter

Battery Life: Approximately 30 hours, 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

AMETEK

For the authorized Chatillon Distributor or Manufacturer's Representative near you, go to www.chatillon.com

