

Part No. NC002739  
April 2010

## **DMG Series Mechanical Dynamometers**

### **User Manual**



**AMETEK** | **Chatillon**  
Force Measurement

**WARRANTY**

This instrument is warranted against defects in workmanship, material and design for one (1) year from date of delivery to the extent that AMETEK will, at its sole option, repair or replace the instrument or any part thereof which is defective, provided, however, that this warranty shall not apply to instruments subjected to tampering or, abuse, or exposed to highly corrosive conditions.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESS OR IMPLIED AND AMETEK HEREBY DISCLAIMS ALL OTHER WARRANTIES, INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY. AMETEK SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO, ANY ANTICIPATED OR LOST PROFITS.

This warranty is voidable if the purchaser fails to follow any and all instructions, warnings or cautions in the instrument's Instruction Manual.

If a manufacturing defect is found, AMETEK will replace or repair the instrument or replace any defective part thereof without charge; however, AMETEK's obligation hereunder does not include the cost of transportation, which must be borne by the customer. AMETEK assumes no responsibility for damage in transit, and any claims for such damage should be presented to the carrier by the purchaser.

**TRADEMARKS**

AMETEK is a registered trademarks of AMETEK, Inc.

CHATILLON is a registered trademark of AMETEK, Inc.

Other trademarks are the property of their respective owners.

## ICONS



### WARNING

The raised hand icon warns of a situation or condition that may lead to personal injury or death. Do not proceed until the warning is read and thoroughly understood. Warning messages are shown in bold type.



### DANGEROUS VOLTAGE

The lightning icon warns of the presence of an uninsulated dangerous voltage within the product enclosure that might be of sufficient magnitude to cause serious shocks or death. Never open the enclosures unless you are an authorized and qualified CHATILLON service personnel. Never open any enclosure when power is connected to the system or its components.



### CAUTION

The exclamation point icon indicates a situation or condition that may lead to equipment malfunction or damage. Do not proceed until the caution message is read and thoroughly understood. Caution messages are shown in bold type.



### NOTE

The note icon indicates additional or supplementary information about the action, activity or concept. Notes are shown in bold type.

## CAUTION

**NEVER OPERATE THE INSTRUMENT AT A HIGHER FORCE CAPACITY THAT THE ACCESSORY CONNECTED TO THE INSTRUMENT, OR OVER THE RATED CAPACITY OF THE INSTRUMENT.**

**IF THE EQUIPMENT IS USED IN A MANOR NOT SPECIFIED BY THE MANUFACTURER, THE PROTECTION PROVIDED BY THE EQUIPMENT MAY BE IMPAIRED.**

**TO MAINTAIN ALL ASPECTS OF THE SPECIFICATION, ONLY AMETEK APPROVED ACCESSORIES, CONNECTIONS AND COMPONENTS SHOULD BE USED.**

**STRICTLY ADHERE TO ALL SPECIFIED SAFETY PROCEDURES**

**READ THIS MANUAL BEFORE USING THIS PRODUCT.**

### General Safety

General safety precautions must be followed when using this CHATILLON product. Failure to observe precautions and warnings may result in damage to the equipment, or injury to personnel.

It is understood that safety rules within companies vary. If a conflict exists between the material contained in all CHATILLON User's Guides and the rules of a company using a CHATILLON product, the more stringent rules should take precedence.

### Safety Considerations

The DMG Series is completely enclosed and provides no potentially hazardous outputs.

Mechanical components housed within the DMG Series covers are to be serviced by authorized CHATILLON representatives only.

NEVER operate the instrument at a higher force capacity that the accessory connected to the instrument, or over the rated capacity of the instrument.

## INTRODUCTION

The DMG Series mechanical dynamometer is ideal for a wide range of functional capacity evaluations, muscle strength and ergonomic testing applications. The DMG Series features a 2.25-inch dial for improved resolution and readability, peak hold button, ergonomic shape and improved accuracy of  $\pm 0.5\%$  of full scale. The DMG gauge is an excellent, economical solution for pull or push testing.

The DMG series gauge can be used as a hand held device with a handle adapter assembly that is supplied standard. The gauges may be ordered with a full complement of testing fixtures (K-DMG Series). Easy to read concentric dial measures clockwise direction only. Dial rotates 360-degrees for taring. A peak hold button captures peak readings. Available in lbf, kgf or N units of measure. DMG Series gauges come with a protective carrying case and handle assembly. The K-DMG Series is supplied with carrying case, handle assembly and full MSCK accessories. A Certificate of Calibration with Data is supplied standard.

## OPERATION

The zero point of the gauge may not always be in the 12 o'clock position due to gravity effects and the weight of fixtures or grips on the force gauge shaft. To zero the gauge, rotate the bezel on the dial indicator so that the indicator pointer lines up with the zero on the dial face.

Gauges are designed for axial loading. Ensure the load is not applied at an angle or an error can be introduced in the force readings. The gauges are designed to have a 10% tare for fixtures and grips. If this 10% tare is exceeded, the force gauge may not measure up to full scale.

## COMPRESSION TESTING

For compression testing, assemble the appropriate attachment or grip to the bottom shaft of the force gauge. For compression testing the shaft should be pushed into the gauge, causing the indicator to rotate in the clockwise direction. Attachments should be applied "finger-tight".

Do NOT overtighten.

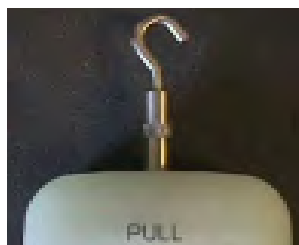


## TENSILE TESTING

For tension testing, assemble the appropriate hook, attachment or grip to the top shaft of the force gauge. For tension testing the shaft should be pulled out of the top of the force gauge, causing the indicator to rotate in the clockwise direction.

Attachments should be applied "finger-tight".

Do NOT overtighten.



**WARNING:** NEVER use the force gauge at a load capacity that is greater than the specified capacity of the gauge or greater than the capacity of the fixture attached to the instrument. NEVER use accessories that are not supplied by AMETEK for this instrument.



**CAUTION:** NEVER apply a load to the DMG Series force gauge so the indicator rotates in the counterclockwise direction. If excessive loads are applied in the counterclockwise direction, damage may occur to the force gauge.



**CAUTION:** The DMG Series is a unidirectional force gauge. When applying a load to the instrument the dial indicator MUST rotate in the clockwise direction.

#### PEAK HOLD

The DMG Series force gauge has a maximum hold feature. This allows the peak force to be held after the load is removed.

#### ACTIVATE PEAK HOLD

To activate this feature, rotate the knob to "MAX ON" position.

#### RESET PEAK HOLD

To reset the reading, simply rotate the switch to "MAX OFF" and then return back to "MAX ON" position. To deactivate this feature, rotate the knob to the "MAX OFF" position.



#### MAINTENANCE

Gauge accuracy should be checked periodically to ensure the gauge is within its calibration limits. The calibration can be verified by applying known weights (adjusted for local gravity) to the extension hook. If adjustment is required, the gauge should be returned to AMETEK for calibration.

#### SPECIFICATIONS

|                        |                             |
|------------------------|-----------------------------|
| Accuracy:              | ±0.5% of Full Scale         |
| Overload Capacity:     | 110% of Rated Capacity      |
| Maximum Overload:      | 150% of Rated Capacity      |
| Tare Capacity:         | 10% of Rated Capacity       |
| Dial Resolution:       | 0.5% of Full Scale          |
| Full Scale Deflection: | 10mm (.394 inches)          |
| Operating Temp:        | 40°F to 110°F (5°C to 45°C) |
| Instrument Weight:     | 4.7 lbs (2.12 kg)           |
| Shipping Weight:       | 8.4 lbs (3.80 kg)           |
| Warranty:              | 1 Year                      |

## ORDERING

### Dynamometer Only

| Model   | Capacity      |
|---------|---------------|
| DMG-200 | 200 x 1 lbf   |
| DMG-500 | 500 x 2.5 lbf |

### Dynamometer Kits

| Model     | Capacity      |
|-----------|---------------|
| K-DMG-200 | 200 x 1 lbf   |
| K-DMG-500 | 500 x 2.5 lbf |

*Dynamometer Kits include Dynamometer with MSCK Kit*

### Optional Test Kits

| Item No. | Description                    |
|----------|--------------------------------|
| MSCK     | Muscle Strength Comparison Kit |

### Accessories

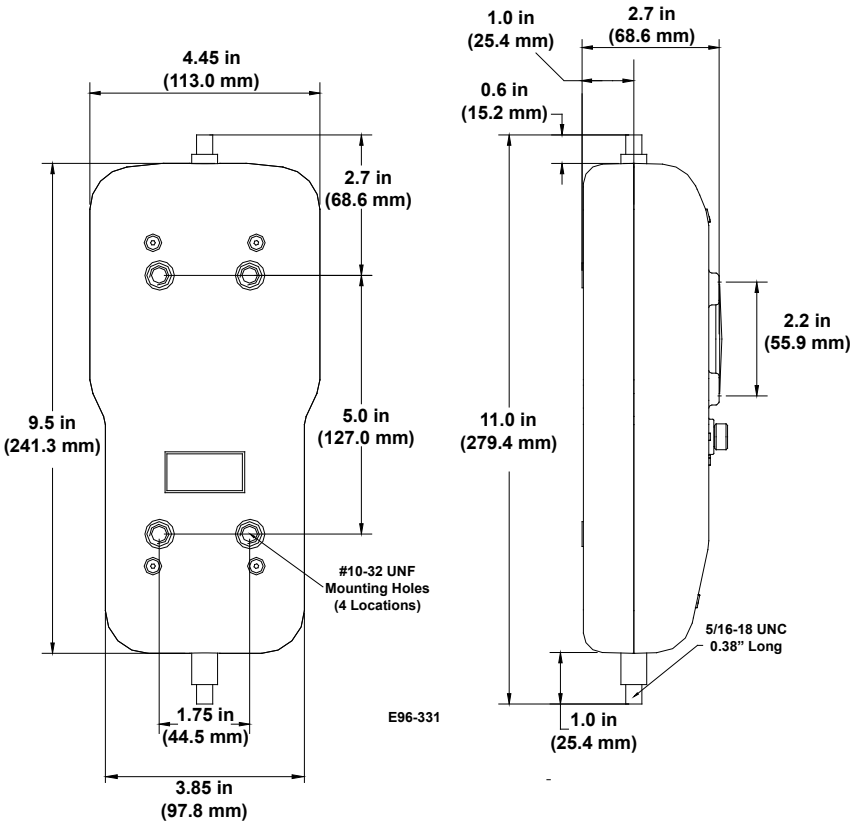
| Item No.      | Description               | Standard |
|---------------|---------------------------|----------|
| NC003115      | Carrying Case             | Yes      |
| SPK-DG-HANDLE | Handle Assembly           | Yes      |
| NC002500      | Hook, Snap Clip           | MSCK     |
| NC00721       | V-Notch, Small            | MSCK     |
| NC00725       | V-Notch, Large            | MSCK     |
| NC002844      | Grasping Cable            | MSCK     |
| SPK-FMG-142   | Curved Compression Plate  | MSCK     |
| SPK-FMG-143   | Compression Plate, Circle | MSCK     |
| SPK-FMG-144   | Palm Fixture              | MSCK     |
| SPK-FMG-145   | Rectangle Plate, large    | MSCK     |
| SPK-FMG-146   | Rectangle Plate, small    | MSCK     |
| SPK-FMG-013B  | Extension Rod, 6"         | MSCK     |
| NC002845      | Soft Carrying Case        | Option   |
| SPK-FMG-008B  | Adapter, Chisel Point     | Option   |
| SPK-FMG-009B  | Adapter, Point            | Option   |
| SPK-FMG-010B  | Adapter, Notch            | Option   |
| SPK-FMG-011B  | Adapter, Flat             | Option   |
| SPK-FMG-012C  | Hook                      | Option   |



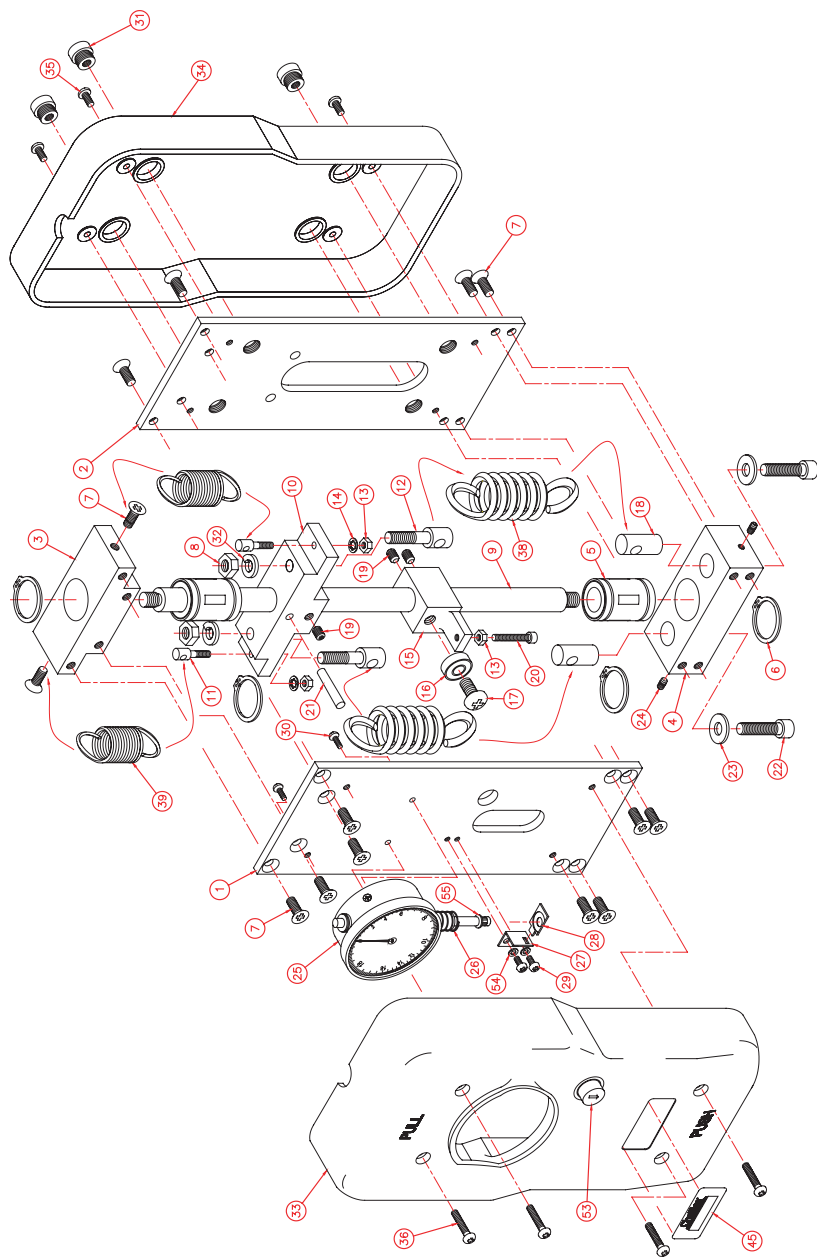
*MSCK Accessory Kit*

*Note: Threaded fixtures are 5/16-18.*

DIMENSIONS



SPARE PARTS



## SPARE PARTS LIST

| Ref. | Item No.    | Description                        |
|------|-------------|------------------------------------|
| 1    | NC002689    | Plate, Upper Support               |
| 2    | NC002690    | Plate, Lower Support               |
| 3    | NC002681    | Frame, Upper Support               |
| 4    | NC002680    | Frame, Lower Support               |
| 5    | 910-04-001  | Ball Bushing                       |
| 6    | 900-46-010  | Retaining Ring                     |
| 7    | 21047       | Screw, #10-32 x 1/2 Flat Head      |
| 8    | 7970        | Nut, 1/4-20 Hex                    |
| 9    | NC002685    | Main Shaft                         |
| 10   | NC002684    | Calibrator                         |
| 11   | NC002663    | Support, Spring, Medium            |
| 12   | NC002682    | Support, Spring, Large             |
| 13   | 3168        | Nut, #6 Hex                        |
| 14   | 10390       | Washer, #6 Lock                    |
| 15   | NC002683    | Bearing Support                    |
| 16   | NC002668    | Ball Bearing, Radial               |
| 17   | E08-250     | Screw, #1/4-20 x 1/2 Pan Head      |
| 18   | NC002692    | Spring Support, Calibrator         |
| 19   | 3127        | Set Screw, #10-32 x 1/4            |
| 20   | NC000124    | Screw, #6-32 x 1 SHC               |
| 21   | NC002688    | Taper Pin, #2 x 1                  |
| 22   | E08-256     | Screw, 1/4-28 x 1 SHC              |
| 23   | 900-30-021  | Washer, 1/4 Flat                   |
| 24   | 900-08-023  | Set Screw, #6-32 x 1/4             |
| 25   | NC002677-09 | Dial Indicator, 200 lbf (DMG-200)  |
|      | NC002677-12 | Dial Indicator, 500 lbf (DMG-500)  |
| 26   | NC002674    | Spring, Compression                |
| 27   | NC002672    | Bracket, Maximum Capture           |
| 28   | NC002673    | Plate, Maximum Capture             |
| 29   | E08-241     | Screw, #4-40 x 3/16 Pan Head       |
| 30   | E08-252     | Screw, #4-40 x 5/16 Round Head     |
| 31   | NC002691    | Threaded Bushing                   |
| 32   | 9766        | Washer, Lock 1/4 ID                |
| 33   | NC002730    | Top Housing                        |
| 34   | NC002731    | Bottom Housing                     |
| 35   | 03-90041    | Screw, #6-32 x 5/16 Pan Head       |
| 36   | E08-251     | Screw, #6-32 x 3/4 Pan Head        |
| 38   | NC002734-1  | Main Spring, 200 lbf (DMG-200)     |
|      | NC002734-4  | Main Spring, 500 lbf (DMG-500)     |
| 39   | SPK-DG-200  | Trim Spring Set, 200 lbf (DMG-200) |
|      | SPK-DG-500  | Trim Spring Set, 500 lbf (DMG-500) |
| 45   | NC002621    | Label, Capacity                    |
| 53   | NC002678    | Latch, Pawl Assembly               |
| 54   | E02-235     | Split Lock Washer, #4              |
| 55   | E02-236     | Washer, Flat, #5                   |