



# Jamar® Smart Hand Dynamometer

FROM PATTERSON MEDICAL



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## USER'S GUIDE

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## **OVERVIEW**

The Jamar Hand Dynamometer has been used for over 40 years to measure grip strength. Now Patterson Medical has redesigned it to make it easier to use with the introduction of the Jamar Smart Hand Dynamometer.

## **FEATURES**

**Precision Electronic Load Cells** eliminate the possibility of oil leakage that sometimes occurred with hydraulic units. The unit allows measurement from 0 to 200 lbs. (90Kg).

**Easy-to-Read Display** helps configure a specific test protocol, and provides step-by-step prompts throughout the testing process. The display will always show the next step in the test, even for rapid exchange protocols. In addition, the Jamar Smart Hand Dynamometer saves the previous test, saving time if the same test protocol is used each time. Up to 5 tests/trials can be conducted with each hand without reset.

**AVERAGE, STANDARD DEVIATION, and COEFFICIENT OF VARIATION** are automatically calculated. Hand to hand rapid exchange tests are separately calculated for each hand.

Individual test readings and all calculations can be reviewed multiple times. The display shows which reading is being displayed to reduce error.

These features, along with the rugged design of the new Jamar Smart Hand Dynamometer, help complete each test more quickly and efficiently resulting in less chance for error in performing calculations and transposing data.

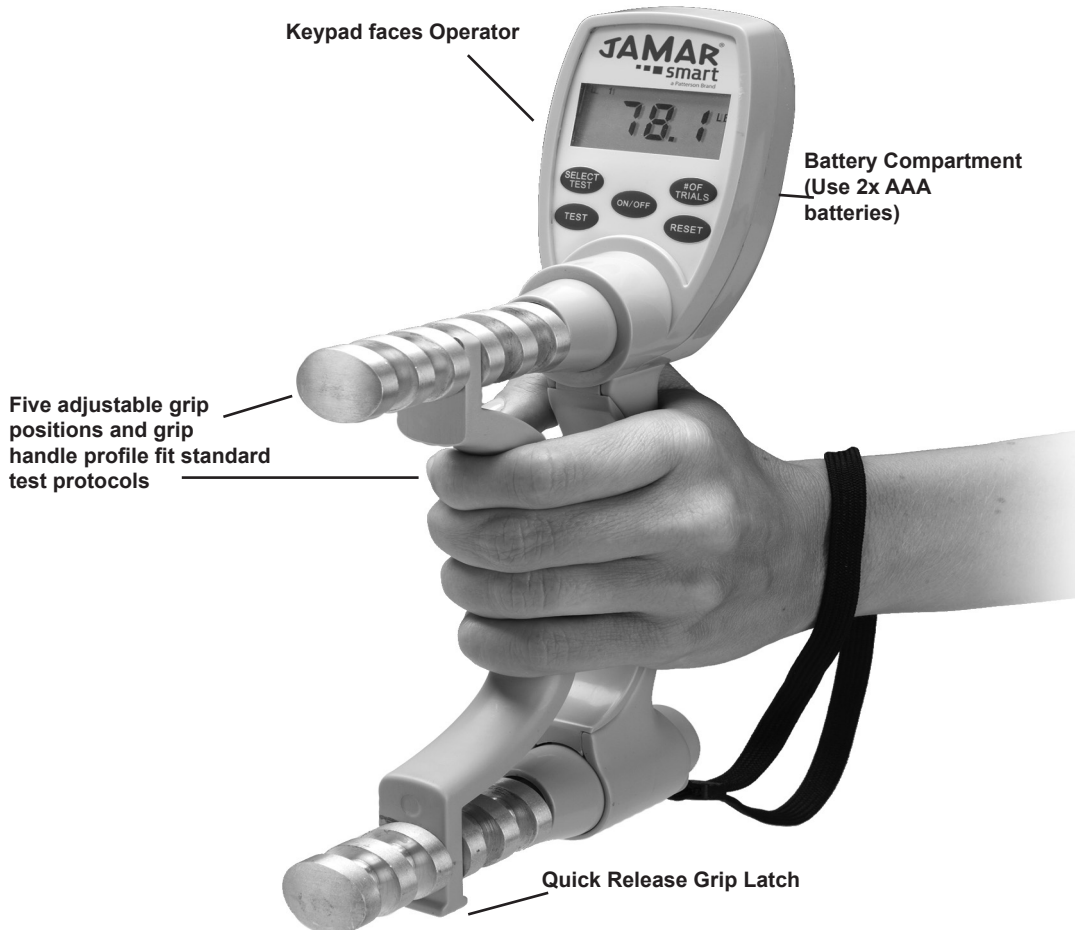
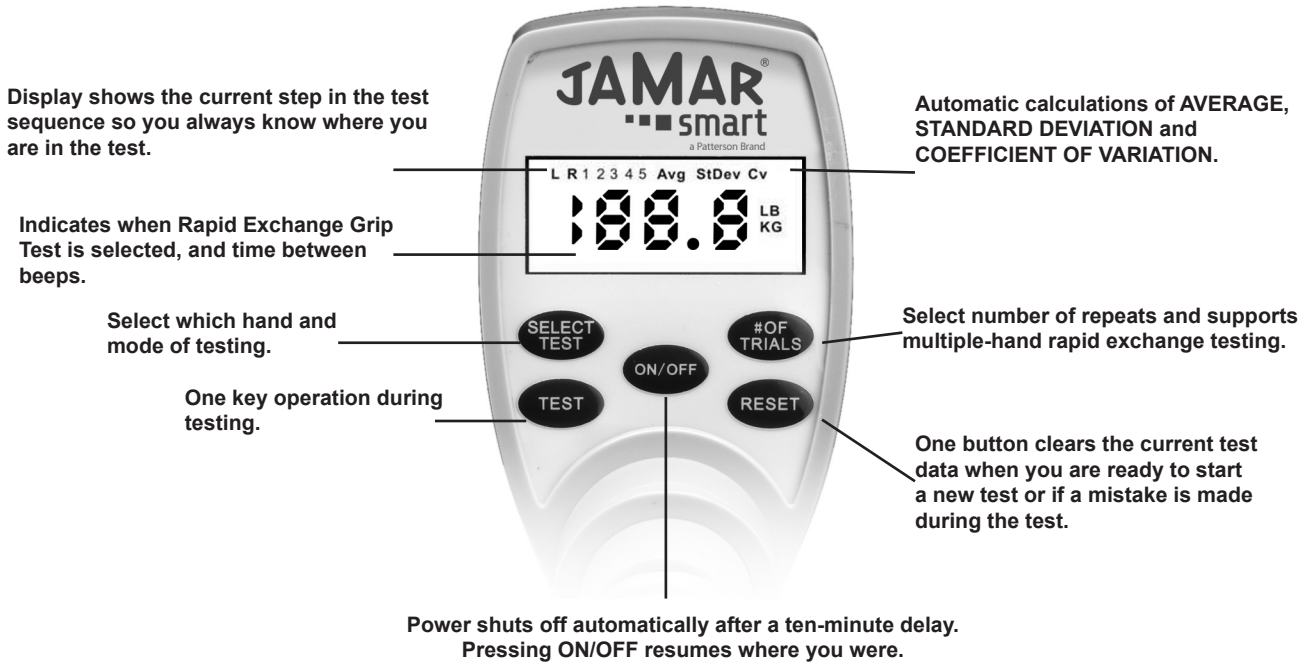
### **DOWNLOAD THE FREE APP**

The new Jamar Smart Hand Dynamometer is the industry's first dynamometer to offer wireless communication to your mobile device. Go to your favorite App store and search for "Jamar Smart". Download the Free App to access many new capabilities.



# CONTROL PANEL

(only active when the App is not being used)



# SET-UP/TEST

## Power ON

Press the [ON/OFF] key on the face of the Jamar Smart Hand Dynamometer. The display will appear as shown below, with the display showing the most recent test protocol. The default test protocol is “R” (Right) “3”, which means the test protocol is set for the Right Hand with three (3) repeats.



## CHOOSING THE HAND TO BE TESTED

Press the [RESET] key to clear any test which might be in progress. Then press the [SELECT TEST] key to step through the available choices. Press [SELECT TEST] for these choices:

### Display

### Test

1	Standard Test Single Hand
L1	Standard Test Left Hand
R1	Standard Test Right Hand
LR1	Standard Test Left and Right Hand
LR 1.5R x 10	Rapid Exchange Grip Test 1.5 second intervals
LR 3.0 R x 10	Rapid Exchange Grip Test 3.0 second intervals

## **CHANGING THE NUMBER OF TRIALS**

Press the [RESET] key to clear any test which might be in progress. Then press the [# OF TRIALS] key to step through the available choices. These choices are:

### **Test**

**Standard Hand Test**

**Either Hand, Left, Right, or Both**

### **Choices**

**1 to 5 trials**

**Rapid Exchange Grip Test**

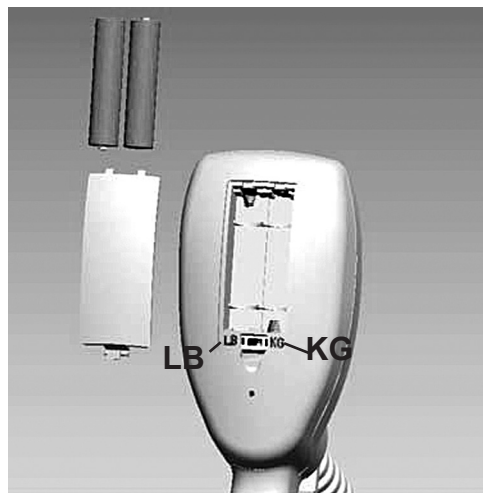
**1.5 or 3.0 Intervals**

**10 or 20 total trials**

Practice changing the hand selection and number of grip repeats to see how these functions work. Once test protocol is changed, the Jamar Smart Hand Dynamometer retains the current protocol until changed.

*NOTE: If the batteries are allowed to run down after the Low Battery indicator comes on, or if they are removed from the instrument for a period of more than approximately one (1) minute, the instrument may return to the default factory test protocol, "R 3". If this happens, simply replace the batteries and reset the desired test protocol.*

## **SELECTING POUNDS OR KILOGRAMS**



## ADJUSTING GRIP POSITION

The grip handle may be placed in any of five (5) positions to accommodate the size and comfort of the user's hand. Push the lower end of the handle so that the slotted portion rotates away from the lower shaft (See diagram below). Making sure not to drop the handle, allow it to separate from the top shaft. Determine the appropriate grip position and replace the top part of the handle on the top shaft. Rotate the lower part of the handle onto the lower shaft until it clicks into place. The special ball detent on the lower part of the handle helps prevent the handle from separating from the shaft during normal use.



## INSTALLING AND REPLACING BATTERIES

Turn the instrument so the Key Pad Operator faces front and the back of the Key Pad Housing faces toward you. Open the compartment cover and install two (2) AAA batteries. (Quality, alkaline or re-chargeable batteries are recommended). Replace the cover after installation. Press the **[ON/OFF]** key on the face of the Jamar Smart Hand Dynamometer to ensure battery installation is correct. As the batteries approach the end of their life cycle, the "BATT" indication will be displayed on the instrument display. Batteries should be replaced as soon as this is displayed to ensure proper unit function.



# **PERFORMING GRIP STRENGTH MEASUREMENTS**

1. **[LB/KG]:** The Jamar Smart Hand Dynamometer is originally set to display in LBs. To change to KG, open up the battery compartment and move the frequency switch down to KG.
2. Adjust the grip handle to best suit patient comfort and test requirement (See Adjusting Grip Position, page 7).
3. Press the **[ON/OFF]** key to start the instrument.
4. Determine which hand will be used. Using the **[SELECT TEST]** key, scroll to the “L” (Left) or “R” (Right) icon to select the hand to be tested.
5. To select the number of test repetitions (up to 5) to be recorded for that hand, press the **[# OF TRIALS]** key. Each of the five numbers (1 through 5) will be displayed on the upper line of the display. Stop scrolling on the number which represents the number of tests to be taken.
6. Have the patient grasp the Jamar Smart Hand Dynamometer gently so that the palm fits comfortably to the rear of the instrument and the fingers curl around the adjustable grip at the front of the instrument.
7. Press the **[TEST]** key to begin the test. Under the present test protocol, start with the first test trial and the number “1” will appear and flash at the top of the display, indicating that the first test for the chosen hand is ready. Have the patient squeeze the grip and be ready to enter the second trial (if test protocol setting has more than 1 trial).
8. When the first test is completed, press the **[TEST]** key one time to scroll to the next test. Repeat the number of trials to complete the test cycle for the chosen hand.

**Example:** The right hand is chosen to perform four tests. Press the **[SELECT TEST]** key and scroll to the “R” (Right) icon. Press the **[# OF TRIALS]** key until the number “4” is displayed. Press the **[TEST]** key to begin the test. “R” and “1” will be displayed on the upper line. Have the patient perform the first test. Press the **[TEST]** key to move the display to “R2”. Have the patient perform the second test. Press the **[TEST]** key after each test until all four tests have been performed.



9. When testing is completed for the chosen hand and the required data is recorded, press the **[RESET]** key to clear the previous test data. Repeat steps 4 through 9 for the remaining hand if desired.

10. To alternate left and right hand tests (i.e., L1 - R1, L2 - R2, L3 - R3, etc) press **[SELECT TEST]** until both the “L” and “R” are displayed. The instrument will automatically alternate “L” and “R” hand test cycles.

11. Press the **[ON/OFF]** key to turn the instrument OFF when testing is complete and return it to a safe storage location.

## **RECORDING GRIP STRENGTH MEASUREMENTS**

Upon completion of the desired tests for a patient’s left and/or right hand, the therapist can select one of two methods for recording the data obtained by those tests.

1. After each individual test, the therapist may choose to record the data displayed on the instrument and perform subsequent calculations at a later date.
2. After all the test trials are completed, the therapist may choose to review the test results stored in the Jamar Smart Hand Dynamometer. All the test and calculation results can be viewed on the display by repeatedly pressing the **[TEST]** key. All results will be displayed in the sequence of: Test Trial 1, Test Trial 2...Test Trial N, AVG, STDEV, CV. There will be an indicator icon shown in the display for each respective result.

## **CALCULATIONS**

Three important calculations are performed automatically by the Jamar Smart Hand Dynamometer: Test Average, Standard Deviation, and Coefficient of Variation.

**Test Average:** Each reading taken for the left hand or right hand is recorded in memory for that hand. When the test is completed, the Therapist uses the **[TEST]** key, located in the lower left of the keypad, to review the average measure of the multiple test trials.

**Standard Deviation:** The Jamar Smart Hand Dynamometer calculates the standard deviation of reading taken. Use the **[TEST]** key to review the standard deviation of the multiple test trials.

**Coefficient of Variation:** To obtain disbursement data, the instrument divides the standard deviation by the average as shown below. Use the **[TEST]** key to scroll to the “CV” icon to display the result.

## **NORMATIVE GRIP STRENGTH DATA:**

		Males		Females		Males		Females	
Age	Hand	Mean (lbs)	SD	Mean (lbs)	SD	Mean (kg)	SD	Mean (kg)	SD
6-7	R	32.5	4.8	28.6	4.4	14.7	2.2	13.0	2.0
	L	30.7	5.4	27.1	4.4	13.9	2.4	12.3	2.0
8-9	R	41.9	7.4	35.3	8.3	19.0	3.4	16.0	3.8
	L	39	9.3	33	6.9	17.7	4.2	15.0	3.1
10-11	R	53.9	9.7	49.7	8.1	24.4	4.4	22.5	3.7
	L	48.4	10.8	45.2	6.8	22.0	4.9	20.5	3.1
12-13	R	58.7	15.5	56.8	10.6	26.6	7.0	25.8	4.8
	L	55.4	16.9	50.9	11.9	25.1	7.7	23.1	5.4
14-15	R	77.3	15.4	58.1	12.3	35.1	7.0	26.4	5.6
	L	64.4	14.9	49.3	11.9	29.2	6.8	22.4	5.4
16-17	R	94	19.4	67.3	16.5	42.6	8.8	30.5	7.5
	L	78.5	19.1	56.9	14	35.6	8.7	25.8	6.4
18-19	R	108	24.6	71.6	12.3	49.0	11.2	32.5	5.6
	L	93	27.8	61.7	12.5	42.2	12.6	28.0	5.7
20-24	R	121	20.6	70.4	14.5	54.9	9.3	31.9	6.6
	L	104.5	21.8	61	13.1	47.4	9.9	27.7	5.9
25-29	R	120.8	23	74.5	13.9	54.8	10.4	33.8	6.3
	L	110.5	16.2	63.5	12.2	50.1	7.3	28.8	5.5
30-34	R	121.8	22.4	78.7	19.2	55.2	10.2	35.7	8.7
	L	110.4	21.7	68	17.7	50.1	9.8	30.8	8.0
35-39	R	119.7	24	74.1	10.8	54.3	10.9	33.6	4.9
	L	112.9	21.7	66.3	11.7	51.2	9.8	30.1	5.3
40-44	R	116.8	20.7	70.4	13.5	53.0	9.4	31.9	6.1
	L	112.8	18.7	62.3	13.8	51.2	8.5	28.3	6.3
45-49	R	109.9	23	62.2	15.1	49.8	10.4	28.2	6.8
	L	100.8	22.8	56	12.7	45.7	10.3	25.4	5.8
50-54	R	113.6	18.1	65.8	11.6	51.5	8.2	29.8	5.3
	L	101.9	17	57.3	10.7	46.2	7.7	26.0	4.9
55-59	R	101.1	26.7	57.3	12.5	45.9	12.1	26.0	5.7
	L	83.2	23.4	47.3	11.9	37.7	10.6	21.5	5.4
60-64	R	89.7	20.4	55.1	10.1	40.7	9.3	25.0	4.6
	L	76.8	20.3	45.7	10.1	34.8	9.2	20.7	4.6
65-69	R	91.1	20.6	49.6	9.7	41.3	9.3	22.5	4.4
	L	76.8	19.8	41	8.2	34.8	9.0	18.6	3.7
70-74	R	75.3	21.5	49.6	11.7	34.2	9.8	22.5	5.3
	L	64.8	18.1	41.5	10.2	29.4	8.2	18.8	4.6
75+	R	65.7	21.	42.6	11	29.8	9.5	19.3	5.0
	L	55	17	37.6	8.9	24.9	7.7	17.1	4.0

## **CALIBRATION**

The unit should be returned to Patterson Medical after 12 months of use for recalibration. (See below for contact details). In the event that the Jamar Smart Hand Dynamometer displays a reading other than zero “0” at the start of a test, the zero point can be reset by performing the following procedure: (1) With the Jamar Smart unit powered on, press the “select test” button and hold it down while pressing the “on/off” button. (2) When you hear two beeps release the “on/off” button. You will hear two beeps when it shuts off signaling that it completed the zero calibration.

## **CARE AND STORAGE**

The Jamar Smart Hand Dynamometer is an electronic instrument and should be cared for in a manner suitable for its function and components. Store the instrument when not in use in a safe location to prevent inadvertent damage. Use a clean, damp cloth and mild detergent for cleaning.

When not in use, the instrument should be stored in the black case provided. Care should be taken, however, to prevent undo stress to the grip posts, as this may damage the post mountings or electronic components.

## **SERVICE AND WARRANTY**

The Jamar Smart Hand Dynamometer is a fully self-contained unit which should provide many years of accurate, dependable service to the user, and contains a (2) year warranty from its date of purchase. Should you experience any questions or problems regarding this instrument, please contact your Patterson Medical country office listed below.

## **FCC Statement:**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**NOTE: Modifications to this product will void the user’s authority to operate this equipment.**

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## Quick Start Guide

1. Press the **[ON/OFF]** key to start the instrument.
2. Determine which hand will be used. Using the **[SELECT TEST]** key, scroll to the “L” (Left) or “R” (Right) icon to select the hand to be tested.
3. To alternate left and right hand tests (i.e., L1 - R1, L2 - R2, L3 - R3, etc.) press **[SELECT TEST]** until both the “L” and “R” are displayed. The instrument will automatically alternate “L” and “R” hand test cycles.
4. To select the number of test repetitions (up to 5) to be recorded for that hand, press the **[# OF TRIALS]** key. Each of the five numbers (1 through 5) will be displayed on the upper line of the display. Stop scrolling on the number which represents the number of tests to be taken.
5. Have the patient grasp the Jamar Smart Hand Dynamometer gently so that the palm fits comfortably to the rear of the instrument and the fingers curls around the adjustable grip at the front of the instrument.
6. Press the **[TEST]** key to begin the test. Under the present test protocol, start with the first test trial and the number “1” will appear and flash at the top of the display, indicating that the first test for the chosen hand is ready. Have the patient squeeze the grip and be ready to enter the second trial (if test protocol setting has more than 1 trial).
7. When the first test is completed, press the **[TEST]** key one time to scroll to the next test. Repeat the number of trials to complete the test cycle for the chosen hand.
8. When testing is completed for the chosen hand and the required data is recorded, press the **[RESET]** key to clear the previous test data. Repeat steps 2 through 9 for the remaining hand if desired.
9. After all the test trials are completed, the test and calculation results can be viewed on the display by repeatedly pressing the **[TEST]** key. All results will be displayed in the sequence of: Test Trial 1, Test Trial 2...Test Trial N, AVG, STDEV, CV. There will be an indicator icon shown in the display for each respective result.
10. Hold the **[ON/OFF]** button for two seconds to turn the instrument OFF when testing is complete and return it to a safe storage location.