Starrett®

PKG08811- QRGDFG

TRUST IS IN THE NAME

Quick Reference Guide

**READ THIS MANUAL BEFORE USING THE INSTRUMENT**

**ANTES DE UTILIZAR EL INSTRUMENTO,
LEA ATENTAMENTE ESTE MANUAL**

**LIRE CE MANUEL AVANT D'UTILISER L'INSTRUMENT**

**LEIA ATENTAMENTE ESTE MANUAL ANTES
DE UTILIZAR O INSTRUMENTO**

使用仪器前请阅读本操作手册

**DIESES HANDBUCH VOR DER VERWENDUNG
DES MESSGERÄTS LESEN**

**LEGGERE ATTENTAMENTE QUESTO MANUALE PRIMA
DI UTILIZZARE QUESTO STRUMENTO**

Starrett®

# DFG DIGITAL FORCE GAGE
# QUICK REFERENCE GUIDE

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# DFG DIGITAL FORCE GAGE


**THIS IS A STARRETT QUICK REFERENCE GUIDE FOR THE DFG DIGITAL FORCE GAGE. ALL SPECIFICATIONS IN THIS DOCUMENT ARE CORRECT AT TIME OF PRODUCTION AND ARE SUBJECT TO CHANGE. PLEASE CONTACT STARRETT FOR FURTHER INFORMATION.**

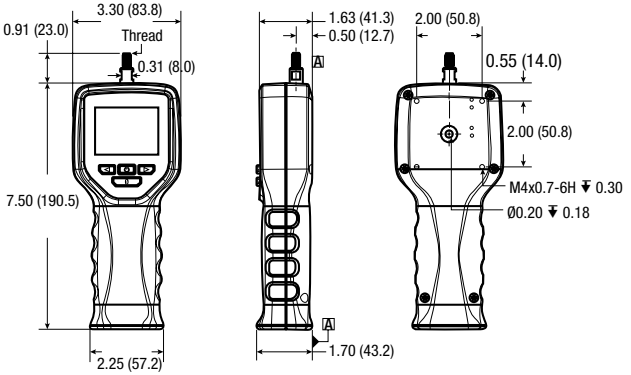
Thank you for choosing the DFG Force Gage.

This Quick Reference Guide is an overview of the basic functions available with your instrument. For detailed instructions on instrument setup and operation, please refer to the electronic user manual. You may download a copy of the user manual at www.Starrett.com/u?dfg-um.

## INTRODUCTION

The DFG is an easy-to-use, accurate and repeatable force gage for tensile and compression applications. The DFG may be used as a handheld instrument or it may be mounted to a Starrett motorized or manual test frame.


| DFG FORCE GAGE | |
|---|---|
| **SPECIFICATION** | **DFG** |
| Accuracy, Full Scale | 0.2% |
| Data Sampling (Hz) | 10,000 |
| Display Resolution | 5,000:1 |
| Safe Overload, Full Scale | 200% |
| Maximum Tare | 10% |
| **COMMUNICATIONS** | |
| USB 2.0 | Yes |
| RS-232 | Yes |
| Memory, saved results max. | 50 |
| **OPERATING MODE** | |
| Real Time | Yes |
| Peak Compression | Yes |
| Peak Tension | Yes |
| **POWER, ENVIRONMENTAL** | |
| Battery Type | Lithium Ion |
| Battery Life, @ 20% brightness | >30 hours |
| Charge Time, using 110/240V Mains | <3 hours |
| Display (OLED) | 320 x 240 |
| Operating Temperature | 40°F to 110°F (4°C to 43°C) |
| Thread, for adapters (Metric) | M6, M10 |
| Instrument Weight (approx.) | 3 lbs (1.36 kgs) |
| **CE COMPLIANCE** | |
| EN61010-1 Safety for Electrical Equipment | Yes |
| EN61000-6-3 EMC Generic Emissions | Yes |
| EN61000-6-1 EMC Generic Immunity | Yes |




| DFG - FORCE GAGE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | LOAD CAPACITY | | | | | FULL SCALE DEFLECTION | | THREAD | ACCESSORY |
| MODEL | N | KGF | LBF | OZF | GF | IN | MM | MM | KIT |
| DFG-10 | 50 | 5 | 10 | 160 | 5,000 | 0.006 | 0.15 | M6 x 1-6H | SPK-FG-S |
| DFG-20 | 100 | 10 | 20 | 320 | 9,000 | 0.008 | 0.20 | M6 x 1-6H | SPK-FG-S |
| DFG-50 | 250 | 25 | 50 | 800 | 23,000 | 0.015 | 0.39 | M6 x 1-6H | SPK-FG-S |
| DFG-100 | 500 | 50 | 110 | 1,600 | 45,000 | 0.024 | 0.60 | M6 x 1-6H | SPK-FG-S |
| DFG-200 | 1,000 | 100 | 225 | - | - | 0.021 | 0.54 | M6 x 1-6H | SPK-FG-M |
| DFG-500 | 2,500 | 250 | 550 | - | - | 0.028 | 0.70 | M10 x 1.5-5H | SPK-FG-L |

NOTES

Load measurement accuracy is ±0.2% of load cell capacity. Display resolution is 5,000:1.

### KEYPAD AND NAVIGATION

The DFG keypad is multi-functional. There are four keys.

### ON/OFF/MENU KEY

This key is used to power the gage on/off. Press to power the gage on. Press and hold for 3 seconds to power the gage off.

This key is also used to access the Setup Menu. When the gage is powered ON, press to access the Setup Menu.

This key is also used to navigate UP when in the Setup Menu. ▲

### ZERO KEY

This key is used to zero the displayed values. Press to zero load.

This key is also used to navigate DOWN when in the Setup Menu. ▼

### SOFTKEY 1

This is the left arrow key. It is used to move out of a setup when in the Setup Menu. ◀

This key may also be mapped to a specific function.

The Setup Menu has a Key setup function where you may assign how Softkey 1 performs. For example, you can assign a SAVE function to the key. When pressed, the measured values are "saved" to memory.

### SOFTKEY 2

This is the right arrow key. It is used to move in to a setup when in the Setup Menu. ▶

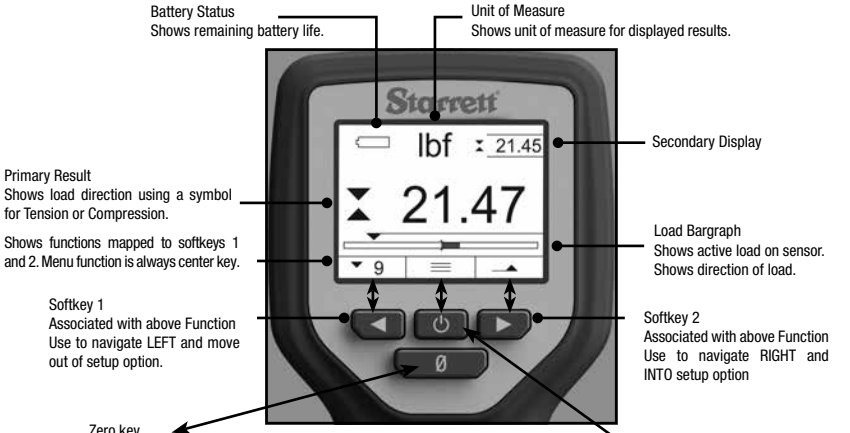
Like the Softkey 1, it also may be mapped to a specific function. For example, you can assign a MODE function to the key. Pressing the key can change the operating modes of the gage. You can switch from Real Time to Peak Tension by pressing Softkey 2.

### DISPLAY LAYOUT

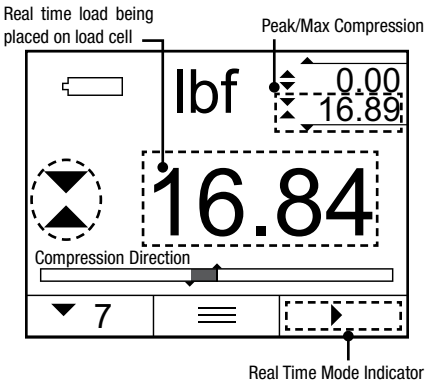
The force gage features a high-resolution OLED color display with adjustable backlight. The backlight may be adjusted from a setting in the Main Menu.

The DFG features a primary and secondary display window.

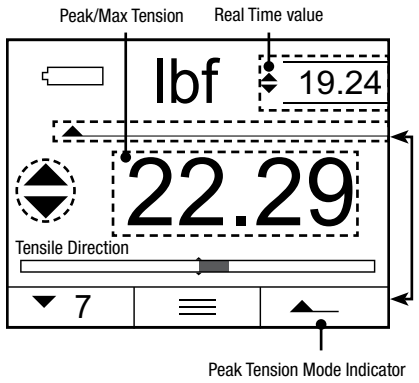
| DISPLAY TYPES | |
|---|---|
| PRIMARY DISPLAY | SECONDARY DISPLAY |
| Real Time | Peak Measurement |
| Peak Tension | Real Time Measurement |
| Peak Compression | Real Time Measurement |



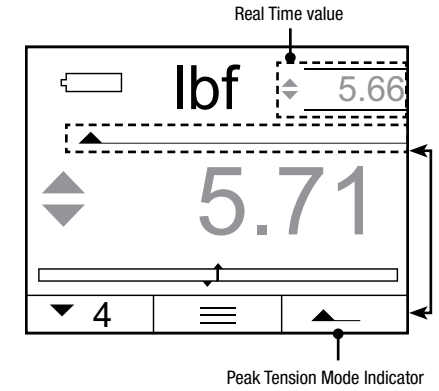

Shown: Display in Classic mode



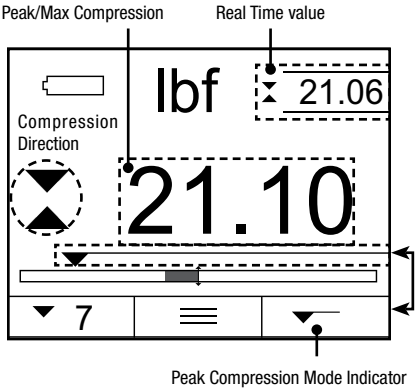

Shown: Real Time view showing Peak Compression




Shown: Peak Tension view




Shown: Peak Tension view with Tolerance result

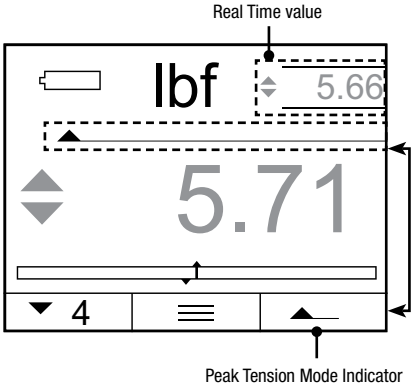



Shown: Peak Compression view

### USING TOLERANCE LIMITS

Use tolerances to setup "pass" and "fail" measurements. You may specify a Limit 1 and a Limit 2 to create a tolerance band. Measured results that equal or fall within the range created by the two limits are considered "pass" results. If the measured result falls outside the band created by the two Limits, the result is considered a "fail" result. A "fail" results displays in RED.

Press ▼ Move to TOLERANCE
Press ▶ Select ENABLE
Press ▼ Move down to LIMITS
Press ▼ Move down to LIMIT 1
Press ▶ Select Limit 1 value using ▼▲
Press ◀ Move out of Limit 1
Press ▼ Move down to LIMIT 1
Press ▶ Select Limit 2 value using ▼▲
Press ◀ Move out of LIMIT 2
Press ◀ Move out of TOLERANCE




Shown: Peak Tension view with Tolerance result

### SAVING RESULTS

The DFG feature an internal memory for saving results for the purpose of calculating and displaying statistics. You may save up to 55 individual results in memory.

To save results to memory, you must configure a softkey with the SAVE function. Press the SAVE softkey to save the displayed results to memory.

Results saved to memory MUST be of the same type. You cannot have mixed type results. For example, you cannot save tension results with compression results. Results MUST be of the same type.

Management of the DFG memory is important to ensure correct statistical analysis. Always clear old results that are from a different test method.

### CLEAR RESULTS FROM MEMORY

Results in memory may be cleared individually or collectively. To clear an individual result from memory, go to the STATS view. Select the results you want to clear. Select the "X" (delete) key.

To clear all results from memory, go to the Memory setup and select CLEAR. This will erase all results for the gage's memory.

### VIEW STATISTICS

You must configure a softkey with STATS to view statistics. When results are saved to memory, you press the STATS softkey to view results in memory and the statistics for those results.

### EXPORT RESULTS

You must configure a softkey with SEND to export to an external device via RS232 or USB. Press the SEND softkey to export the displayed result.

### GAGE SETUP

#### MODES

Press ▲ for Menu
Press ▼ for Modes
Select your Mode, press ◄ to exit setup

#### UNITS

Press ▲ for Menu
Press ▼ for Units
Select your Units, press ◄ to exit setup

#### MEMORY

Press ▲ for Menu
Press ▼ for Memory
Press ► to Display results from memory
Press ► to Clear results from memory
Press ► to Export results from memory
Select your Units, press ◄ to exit setup
*You must configure a softkey to display memory and statistics.

#### TOLERANCE

Press ▲ for Menu
Press ▼ for Tolerance
Press ► to Enable Tolerance
Press ► to setup Limit 1, select Limit 1 value ▲▼
Press ► to setup Limit 2, select Limit 2 value ▲▼
Press ◄ to exit setup

#### KEYS

Press ▲ for Menu
Press ▼ for Keys
Press ▼ to specify a Sound for key presses
Press ▼ to specify Softkey 1 function
Press ▼ to specify Softkey 2 function
Press ◄ to exit setup
*Certain gage functions require a softkey to be setup in order to use the function- Memory, Statistics, Export (Send)

#### SETTINGS

Press ▲ for Menu
Press ▼ for Settings, select Settings Type

#### COMMUNICATIONS

Press ▼ for Communications (Comms)
Press ► to specify the Data Channel method for exporting results: USB, RS-232, or BT (Bluetooth®)
Press ▼ to select RS-232
Press ▼ to select RS-232 Baud Rate
Press ▼ to setup direction sign (- default for Compression)
Press ▼ to transmit Units
Press ▼ to transmit Tolerance Limits
Press ◄ to exit Comms setup

#### DISPLAYS

Press ▼ for Display
Press ► to setup Auto Off
Press ► to setup Backlight Brightness
Press ► to setup Flip orientation (required for TESTS feature)
Press ► to setup Radix
Press ◄ to exit Display setup

#### FILTERS

Press ▼ for Filters
Press ► to specify filter rate
Press ◄ to exit Filter setup

#### ABOUT

Press ▼ for About
Press ► to view the gage's characteristics, serial number, overload history and more.
Press ◄ to exit setup
*The About setup is read-only.

#### PASSWORD

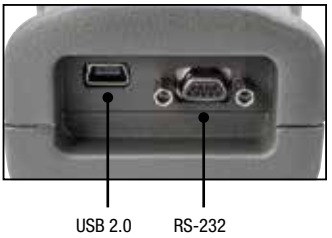
Press ▼ for Password
Press ► to Enable a Password
Press ▲▼ to select the Passcode
Press ◄ to exit setup

#### LANGUAGE

Press ▼ for Language
Press ▼ to your preferred display language
Press ◄ to exit setup
Press ▼ to your preferred display language
Press ◄ to exit setup

### CHARGING BATTERY

Connect the USB cable supplied with your DFG to the USB connector at the base of the gage. Connect the opposite end of the cable to the USB connector on a source device, i.e., personal computer, USB adapter.




| GAGE SETUP MENU STRUCTURE | | | | | |
|---|---|---|---|---|---|
| MODES | UNITS | MEMORY | TOLERANCE | KEYS | SETTINGS |
| Real Time | ozf | Display | Enable | Enable | Comms |
| Peak Tension | lbf | Clear | Limit 1 | Softkey 1 | Data Channel |
| Peak Compression | gf | Export | Limit 2 | Send | RS-232 |
| | kgf | | Sound | Units | Xmit Comp - |
| | N | | | Save | Xmit Units |
| | | | | Mode | Xmit TOL |
| | | | | Stats | Display |
| | | | | Start/Stop | Auto Off |
| | | | | Return 0 | Backlight |
| | | | | Softkey 2 | Flip |
| | | | | Send | Radix |
| | | | | Units | Filter |
| | | | | Save | About |
| | | | | Mode | Password |
| | | | | Stats | Language |
| | | | | Start/Stop | English |
| | | | | Return 0 | Deutsch |
| | | | | | Espanol |
| | | | | | Portugues |
| | | | | | Francais |
| | | | | | Italiano |
| | | | | | Chinese |
| | | | | | Russian |
| | | | | | Polski |
| | | | | | Czech |

If the DFG is connected to an FMM test frame and power to the frame is ON, the DFG battery is continuously charged.

| PROTOCOL | WHERE TO USE |
|---|---|
| USB 2.0 | Charge DFC Battery<br>Upload firmware and new features to DFG from a PC<br>Export data to a printer<br>Export data to a PC |
| RS-232 | Communicate with FMM Series digital force tester<br>Charge DFG Battery when connected to the FMM digital force tester<br>Communicate with a serial printer<br>Communicate with a serial external computer or hard drive |

### COMMUNICATING WITH EXTERNAL DEVICES

The DFG can communicate using USB 2.0 and RS-232. Select the Data Channel type to be used.

Shown: DFG mounted to FMM-110 digital test frame

Shown: DFG mounted to MTH-550 manual test frame

Shown: DFG mounted to MTL-110 manual test frame

| DIGITAL FORCE GAGES | | |
|---|---|---|
| **SPECIFICATION** | **DFC** | **DFG** |
| Accuracy, Full Scale | 0.1% | 0.2% |
| Data Sampling (Hz) | 25,000 | 10,000 |
| Display Resolution | 10,000:1 | 5,000:1 |
| Safe Overload, Full Scale | 200% | 200% |
| Maximum Tare | 10% | 10% |
| **COMMUNICATIONS** | | |
| Bluetooth® | Yes | No |
| USB 2.0 | Yes | Yes |
| RS-232 | Yes | Yes |
| Digital I/O | 2 channels | No |
| Memory, maximum results saved in gage | 99 | 50 |
| **OPERATING MODE** | | |
| Machine Control[1] | Yes | No |
| Real Time | Yes | Yes |
| Peak Compression | Yes | Yes |
| Peak Tension | Yes | Yes |
| Load Limit | Yes | Yes |
| Break Limit | Yes | No |
| Load Average | Yes | No |
| Load-Time Average | Yes | No |
| Cyclic Count (99,999 maximum) | Yes | No |
| Cyclic Duration (27 hours) | Yes | No |
| Hold Duration (27 hours) | Yes | No |
| **POWER, ENVIRONMENTAL** | | |
| Battery Type | Lithium Ion | |
| Battery Life, typical @ 20% brightness | >30 hours | |
| Charge Time, using 110/240V Mains | <3 hours | |
| Display | OLED High Resolution | |
| Operating Temperature | 40°F to 110°F (4°C to 43°C) | |
| Thread, for adapters | Metric M6, M10 | |
| Instrument Weight (approx.) | 3lbs (1.36kgs) | |

NOTES

Machine control is exclusive to the DFC. When connected to the FMM Digital Force Tester, configuration of force gage and tester is performed through the gage.

Starrett offers two models of digital force gages. The DFC is our most advanced gage. The DFC can be used as either a gage or a controller. As a controller, the gage can be used to measure load and control the FMM test frame.


Shown: DFC displays both Load and Distance when connected to the FMM test frame.

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