

IMPORTANT

CORRECTION FOR FDX OPERATION MANUAL

REFER PAGE 23: SECTION F3. INTERCHANGING FORCE CELL MODULES, SELECTING THE FORCE CELL MODULE. REPLACE STEPS 1-3 AS FOLLOWS:

1. Power off the gage. While holding down ON/OFF, press SET and follow by UNITS. Release ON/OFF to access the calibration menu. The current programmed unit and capacity "2 lbf" is displayed. The blinking display indicates the value is the current programmed unit and capacity.

Use the steps below to select the new capacity.

2. Press ↑ to step through available capacities until "50.00 lbf" is displayed.
3. Press UNITS to step through available units until "25.00 kgf" is displayed (25.00 "kgf" corresponds to the 50.00 "lbf" unit setting).

IMPORTANT: UNITS MUST BE SET ON "kgf" MODE WHILE ENTERING THE NEW LOAD CELL SENSITIVITY VALUE. If testing requires the "lbf" or "N" mode, reset UNITS only after exiting the set-up mode to avoid corrupting gage calibration.

- 3a. Press ENTER to save the new capacity and unit settings. The display blinks and displays the digit "2" value before the decimal point of the 2.0123 mv/v of the previous Force Cell Module. The digit "2" is blinking to indicate that this digit is being set.
4. CONTINUE TO PAGE 24.

**WAGNER FORCE TEN
MODELS FDXE & FDXE-R
Force Gage
Operation Manual**

**IMPORTANT
READ THIS BEFORE USING THE FORCE GAGE**

**CAUTION
EXCESSIVE OVERLOAD,
OVER 25% ABOVE RATED CAPACITY,
MAY CAUSE *PERMANENT DAMAGE* TO THE LOAD CELL.**

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A. GENERAL INFORMATION

A.1 Operation Features

- Internal digital sampling rate of 16,000 samples per second.
- Easy operation with a four-key rubber keypad.
- Easy two point calibration and calibration by sensitivity setting of both interchangeable integral and remote load cells.
- Easy installation of interchangeable integral (FDXE) and remote (FDXE-R) load cells.
- Easy calibration adjustment to fine tune calibration or for accuracy checking.
- In AVERAGE mode, the gage automatically averages 2,000 real-time samples and captures both tension and compression peak forces at 16,000 samples per second. The gage automatically displays the average force 8 times per second. The display indicates "T" for tension or "C" for compression corresponding to the direction of the applied load.
- In PEAK mode, the gage automatically captures both tension and compression peak forces at 16,000 samples per second and displays peak force.
- PEAK mode may be engaged prior to testing to capture and display the real-time tension or compression peak forces at 16,000 samples per second. It may also be engaged after a test to display the tension or compression peak force.
- Selectable units are lbf (ozf), kgf (gf) or N. The 250 gf gage has selectable units of ozf, gf or N.
- A battery pack of five rechargeable NiCad batteries allows 8 hour of continuous battery operation with 8-10 hours charge or continuous AC operation via the accompanying charger.
- Low battery indicator when first displayed for fully charged batteries indicates there is approximately 20 minutes before the batteries require recharging.
- Two battery chargers for 115 Vac and 220 Vac are available. To charge the batteries, plug the accompanying charger into the proper AC main and insert the charger plug into the jack on one end of the gage. Charging the batteries for 8-10 hours yields approximately 8 hours of continuous operation. The batteries can be recharged more than 600 times.
- To increase battery life, after the batteries have been charged for 8-10 hours, the charger plug should be removed from the gage or if the charger is always connected to the gage, the gage should not be powered off.
- Automatic power off feature preserves battery life. The gage powers off if it idles for 20 minutes. Operator may deactivate this feature if desired.

A.2 Physical Design Features

- A four-key rubber keypad.
- Die-cast aluminum reversible housing. Split housing design permits upright display whether gage is hand held or test stand mounted.

- Easy to read 1/2" high 4 1/2 digits LCD to display force value. Other displays on the LCD are "lbf", "ozf", "kgf", "gf", "N", "T", "C", "PEAK", "CAL", "SET" and low battery indicator.
- Two #10-32 tapped holes are provided in the rear of the gage for mounting on test stand. An adapter maybe required on some stands. Be sure to use screws that extend no more than 9/32 inch into the gage.
- Load cell shaft has #10-32 x 3/16 threads for mounting test fixture.

B. INTERFACE FEATURES

B.1 Keypad Functions

A four-key rubber keypad is used to operate the gage. When a key is pressed, the LCD flickers to acknowledge that the key is pressed. The key function is not executed until the key is released. The following is a summary of the key functions:

ON/OFF Powers the gage on or off.

ZERO Zeros the displayed value.

PEAK Activates PEAK mode.

UNITS Selects and saves unit in memory and updates the displayed value in the selected unit.

B.2 Power On

Press ON/OFF to power on the gage. During power on, the gage displays all the digits and characters on the LCD for one second and then displays unit and capacity for two seconds before going to AVERAGE mode.

B.3 Power Off

Press ON/OFF to power off the gage. The gage powers off in 1.6 seconds.

B.4 Setting Automatic Power Off Parameter

Power off the gage. While holding down ON/OFF, press PEAK and then release ON/OFF to access the Automatic Power Off parameter.

Parameters	Value s	Descriptions
Automatic Power Off	PO20	Automatic power off after 20 minutes of idle time (default)
	PO- -	No automatic power off

A blinking display indicates that the displayed value is the current programmed value. The following keys are used to change the Automatic Power Off parameter.

UNITS Toggles between the available values.

ZERO Enters the selected value into memory and the gage returns to AVERAGE mode.

C. TEST MODES

C.1 AVERAGE Mode

In AVERAGE mode, the gage automatically averages 2,000 real-time samples and captures both tension and compression peak forces at 16,000 samples per second and displays the average force 8 times per second. The display indicates "T" for tension or "C" for compression corresponding to the direction of the applied load. Any time the average force is an overload, the gage displays "- - -" until the overload is removed.

The following keys are active during AVERAGE mode.

- ZERO Zeros the average force.
- UNITS Selects and saves unit in memory and updates the displayed value in the selected unit.
- PEAK Activates T PEAK mode.

C.2 T PEAK Mode

Press PEAK during AVERAGE to activate T PEAK mode. In T PEAK mode, the gage automatically captures both tension and compression peak forces at 16,000 samples per second and displays tension peak force. The gage displays "- - -" when an overload tension peak force is captured.

The following keys are active during T PEAK mode.

- ZERO Zeros the tension peak force.
- UNITS Selects and saves unit in memory and updates the displayed value in the selected unit.
- PEAK Activates C PEAK mode.

C.3 C PEAK Mode

Press PEAK during T PEAK to activate C PEAK mode. In C PEAK mode, the gage automatically captures both tension and compression peak forces at 16,000 samples per second and displays compression peak force. The gage displays "- - -" when an overload compression peak force is captured.

The following keys are active during C PEAK mode.

- ZERO Zeros the compression peak force.
- UNITS Selects and saves unit in memory and updates the displayed value in the selected unit.
- PEAK Returns to AVERAGE mode.

D. INTERCHANGING FORCE CELL MODULES

D.1 Connecting a new Integral Force Cell Module (FCMX)

To install an interchangeable integral Force Cell Module, the capacity and sensitivity value of the new Module's load cell need to be entered into the display module.

The sensitivity value used for gage calibration and set-up is the actual full scale mV/V signal output of the gage load cell. Each load cell has its own "signature" sensitivity value, which is marked directly and clearly on the load cell. The sensitivity value should be nominally close to 2.0000, the specified full scale signal output of the FDXE load cell.

Sensitivity calibration should be used to install a new load cell with measured sensitivity into the gage. Use the procedures and examples below to calibrate the gage with a 50 lb load cell with sensitivity of 1.9873 mv/v. The gage was previously calibrated with a 5 kg load cell with sensitivity of 2.0123 mv/v.

1. Power off the gage. Detach the back half of the gage, the Force Cell Module (FCMX 10), from the front half of the gage, the Force Display Module. Note the sensitivity value of the new FCMX 50 Force Cell Module (1.9873), written clearly on the unit, as it will be required for resetting the gage after the gage has been resealed. Carefully attach the FCMX 50 Module to the front half of the gage, the Force Display Module using two socket screws located on the gage back. Power on the gage to check the full connection of the FCMX 50.
2. Power off the gage. While holding down ON/OFF, press PEAK followed by ZERO, then release ON/OFF to access the calibration menu. The current programmed unit and capacity "5.000 kgf" is displayed and blinking. The blinking display indicates that the displayed value is the current programmed unit and capacity.

Use the steps below to select the new capacity.

3. **IMPORTANT: UNITS MUST BE SET ON "kgf" MODE WHILE ENTERING NEW LOAD CELL SENSITIVITY VALUE.** If testing requires the "lbf" or "N" mode, reset UNITS only after exiting the set-up mode to avoid corrupting gage calibration.
4. Press PEAK to step through the available capacities until "25.00" (25.00 kgf corresponds to the 50.00 lbf UNIT setting) is displayed. Press ZERO to enter a newly selected capacity or to continue to the next parameter if no changes are made.

Use the steps below to enter the sensitivity of 1.9873 mv/v of the new load cell.

Key functions for sensitivity calibration are as follows:

UNITS Changes value of individual digit.

PEAK Selects which digit to change.

ZERO Enters/Saves new selection.

5. Once the capacity setting is made, the display blinks and displays the digit "2" (value before the decimal point) of the sensitivity of 2.0123 mv/v of the previous load cell. The digit "2" is blinking to indicate that this digit is being set.
6. Press UNITS to step through the available values until "1" is displayed.
7. Press ZERO to select the "1", and then ".0123" (value after the decimal point) of the sensitivity of 2.0123 mv/v of the previous load cell is displayed. The most right digit "3" is blinking to indicate that this digit is being set.
8. Note that the most right digit "3" need not be changed. Proceed to step 9.
9. Press PEAK to move the cursor to the next digit "2" on the left. The digit "2" is blinking to indicate that this digit is being set.
10. Press UNITS to step through the available values until ".0173" is displayed.
11. Repeat steps 8 and 9 until ".9873" is displayed.

12. Press ZERO to enter the sensitivity of 1.9873 mv/v of the new load cell into memory. The display blinks and calibration is complete.

D.2 Connecting a new Remote Force Cell Module (FCX)

To install an interchangeable remote load cell, only the capacity of the gage needs to be changed. Use the procedures and examples below to install an interchangeable remote 50 lb load cell. The gage was previously calibrated with a 5 kg interchangeable remote load cell.

1. Power off the gage. While holding down ON/OFF, press PEAK and follow by ZERO, then release ON/OFF to access the installation menu. The current programmed unit and capacity "5.000 kgf" is displayed and blinking. The blinking display indicates that the displayed value is the current programmed unit and capacity.

Use the steps below to select the new capacity.

2. **IMPORTANT: UNITS MUST BE SET ON "kgf" MODE WHILE ENTERING NEW LOAD CELL SENSITIVITY VALUE.** If testing requires the "lbf" or "N" mode, reset UNITS only after exiting set-up mode to avoid corrupting gage calibration.
3. Press PEAK to step through the available capacities until "25.00" (25.00 kgf corresponds to the 50.00 lbf UNIT setting) is displayed. Note that if capacity need not be changed, skip this step.
4. Press ZERO to enter the selected capacity into memory. The display blinks and installation is complete.

E. CALIBRATION

E.1 Complete Calibration

Complete calibration should only be used to calibrate a gage for the very first time during manufacture. Use the procedures and examples below to calibrate a gage with a 50 lb load cell with sensitivity of 2.0100 mv/v. The gage was previously calibrated with a 5 kg load cell with sensitivity of 1.9880 mv/v.

Although calibration may be performed using certified lbf, kgf, or N weights, THE SENSITIVITY VALUE SHOWN ON EACH FORCE CELL MODULE CORRESPONDS TO CALIBRATION IN "kgf". If calibration is performed in the "lbf" or "N" mode, the sensitivity value registered may differ from the value marked on the unit. Calibration in "lbf" or "N" is valid, but if the gage is rematched with another Force Cell Module, the sensitivity value must be entered while the gage set-up is in "kgf" mode.

1. Power off the gage. Setup the gage for tension or compression load, including weight hangers, hooks or fixtures needed to load the full gage capacity. While holding down ON/OFF, press UNITS, followed by ZERO and then release ON/OFF to access the calibration menu. The current programmed unit and capacity "5.000 kgf" is displayed and blinking. The blinking display indicates that the displayed value is the current programmed unit and capacity. Allow 5 minutes for stabilization prior to calibration.

Use the steps below to select the new unit and capacity.

2. Press UNITS to step through the available units until "lbf" is displayed. Press ZERO to enter a newly selected unit or to continue to the next parameter if no changes are made.
3. Press PEAK to step through the available capacities until "50.00" is displayed. Press ZERO to enter a newly selected capacity or to continue to the next parameter if no changes are made.
4. The display blinks and displays "CAL" and the selected capacity of the new load cell "50.00".

Use the steps below to read the calibration data for simulated 50 lb and 0 lb load.

5. Load 50 lb of dead weight on the gage and allow the dead weight to stabilize. Press ZERO to read the calibration data for 50 lb. The gage then displays "0.00".
6. Remove the 50 lb dead weight. Allow to stabilize and press ZERO to read the calibration data for 0 lb. The gage has now captured the calibration values for 0 lb and 50 lb.

Use the steps below to enter the sensitivity of 2.0100 mv/v of the new load cell.

7. The display blinks and displays the digit "1" (value before the decimal point) of the sensitivity of 1.9880 mv/v of the previous load cell. The digit "1" is blinking to indicate that this digit is being set.
8. Press UNITS to step through the available values until "2" is displayed.
9. Press ZERO and then ".9880" (value after the decimal point) of the sensitivity of 1.9880 mv/v of the previous load cell is displayed. The most right digit "0" is blinking to indicate that this digit is being set.
10. Note that the most right digit "0" need not be changed. Proceed to step 11.
11. Press PEAK to move the cursor to the next digit "8" on the left. The digit "8" is blinking to indicate that this digit is being set.
12. Press UNITS to step through the available values until ".9800" is displayed.
13. Repeat steps 11 and 12 until ".0100" is displayed.
14. Press ZERO to enter the sensitivity of 2.0100 mv/v of the new load cell into memory. The display blinks and calibration is complete.

E.2 Calibration Adjustment

Calibration adjustment may be used to fine tune calibration or for accuracy checking. Use the procedures and examples below to adjust calibration using calibrated dead weight.

1. Setup the gage for tension or compression load. Power on the gage. Allow 5 minutes for stabilization prior to calibration adjustment. While holding down ZERO, press UNITS and then release ZERO to access the calibration adjustment menu. The gage displays "SET" to indicate that it is in calibration adjustment menu.
2. Load the calibrated dead weight on the gage.
3. If the displayed value is less than the calibrated dead weight, press UNITS to increase the displayed value until it matches the calibrated dead weight.
4. If the displayed value is greater than the calibrated dead weight, press PEAK to decrease the displayed value until it matches the calibrated dead weight.
5. Once the displayed value matches the calibrated dead weight, other calibrated dead weight may be used to check the calibration.
6. Note that the calibration adjustment can be discarded by pressing ON/OFF to power off the gage.
7. Press ZERO to enter the calibration adjustment into memory and calibration adjustment is complete.

F. MODELS

F.1 FDXE Integral Load Cell Series

Model	Capacity x Graduation	Safe Overload
FDXE 08	8 x 0.005 ozf 250 x 0.1 gf 2.5 x 0.001 N	0.75 lbf
FDXE 2	2 x 0.001 lbf 1 x 0.0005 kgf 10 x 0.005 N	2.5 lbf
FDXE 10	10 x 0.005 lbf 5 x 0.002 kgf 50 x 0.02 N	12.5 lbf
FDXE 50	50 x 0.02 lbf 25 x 0.01 kgf 250 x 0.1 N	63 lbf
FDXE 100	100 x 0.05 lbf 50 x 0.02 kgf 500 x 0.2 N	125 lbf
FDXE 200	200 x 0.1 lbf 100 x 0.05 kgf 1000 x 0.5 N	250 lbf

F.2 FDXE-R Interchangeable Remote Load Cell Series

Model	Capacity x Graduation	Safe Overload
FDXE-R 08	8 x 0.005 ozf 250 x 0.1 gf 2.5 x 0.001 N	.75 lbf
FDXE-R 2	2 x 0.001 lbf 1 x 0.0005 kgf 10 x 0.005 N	2.5 lbf
FDXE-R 10	10 x 0.005 lbf 5 x 0.002 kgf 50 x 0.02 N	12.5 lbf
FDXE-R 50	50 x 0.02 lbf 25 x 0.01 kgf 250 x 0.1 N	63 lbf
FDXE-R 100	100 x 0.05 lbf 50 x 0.02 kgf 500 x 0.2 N	125 lbf
FDXE-R 200	200 x 0.1 lbf 100 x 0.05 kgf 1000 x 0.5 N	250 lbf
FDXE-R 500	500 x 0.2 lbf 250 x 0.1 kgf 2500 x 1 N	625 lbf
FDXE-R 1000	1000 x 0.5 lbf 500 x 0.2 kgf 5000 kg x 2 N	1250 lbf
FDXE-R 2000	2000 x 1 lbf 1000 x 0.5 kgf	2500 lbf

Model	Capacity x Graduation	Safe Overload
	10000 x 5 N	
FDXE-R 5000	5000 x 2 lbf 2500 x 1 kgf	6250 lbf
FDXE-R10000	10000 x 5 lbf 5000 x 2 kgf	12500 lbf

G. SPECIFICATIONS

PARAMETER	SPECIFICATION
Accuracy	± 0.1% of Full Scale ± 1 LSD
Sampling Rate	16,000 samples per second
Display Update	8 updates per second
Tare	10% of Full Scale (in lbf mode)
Deflection	0.010" Max for Full Scale Load
Battery Operation Time	8 hours of continuous operation with full charge
Battery Charge Time For Full Charge	8 - 10 hours
Battery Life Span	Over 600 charges
Operating Temperature	40° F to 110° F (5° C to 45° C)
Temperature Stability	0.03 % per °F

H. WARRANTY AND LIMITATION OF LIABILITY

Wagner Instruments expressly warrants for one year from the date of purchase that the goods sold shall be free from defects in workmanship and materials under normal conditions. Wagner Instruments will, at its option, replace, repair, or refund, in full, the purchase price of the instrument or any part thereof which in our opinion is defective, provided the instrument has not been subjected to tampering, abuse, or exposed to highly corrosive conditions. An instrument that has been improperly used cannot be considered under this warranty. We make no warranties, expressed or implied, including, without limitation, any warranties of fitness or merchantability, except as expressly set forth above. We shall not be liable for any anticipated lost profits, incidental damages, consequential damages, costs, time charges, or other losses in connection with the instrument or any replacement parts thereof. If a manufacturing defect is found, we will replace or repair the instrument or replace any defective part thereof without charge; however, our obligation hereunder does not include the cost of transportation, which must be borne by the customer. We assume no responsibility for damage in transit, and any claims for such damage should be presented to the carrier by the purchaser. In addition, instead of replacing or repairing the instruments as aforesaid, we may at our option, take back the defective instrument and refund, in full settlement, the purchase price thereof.

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