

Model 5030DG

DualGrip Digital Dynamometer

User Instructions



**Lafayette
Instrument.**

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Features

- Two-position grip handle for small and large hands.
- Low weight dynamometer suitable for pediatric and adult use.
- Select force measurements in pounds (lbs), kilograms (kg), or Newtons (N)
- Easy-to-read graphical LCD display
- Battery indicator on LCD display
- Interactive menus allowing user to select options
- Automatic storage of data in dynamometer memory (Optional)
- Built-in stored data browsing capability
- Automatic shut down can be adjusted between 10-30 minutes of inactivity
- Compatible with LEval app for Android and iOS

Specifications

- Size: 3.25" x 7.69" x 2.85" (8.3 cm x 19.5cm x 7.2 cm)
- Weight: 0.7 lbs (317.5 g)
- Range: 0-200 lbs (90.7 kg or 889.6 N)
- Accuracy: $\pm 1\%$ over full scale or ± 0.2 lbs (± 0.09 kg or ± 0.9 N)
- Resolution: 0.1 lbs (0.1 kg or 1 N)
- Battery: One (1) rechargeable lithium-ion battery
- Battery Life: 10 Hours
- Charge Time
 - 80% approx. 45 minutes
 - 100% approx. 2 hours
- Data Storage Capacity: 100 tests
- Preset Test Length: 1-10 seconds in 1 second increments
- 25 ms sample rate

Interface

1. **Screen:** LCD display for testing data
2. **POWER/MENU/SELECT Button:** This round button is used to power on and off the DualGrip. While the DualGrip is powered on, pressing this button allows users to switch between the various screens, and select a number of options within each. Holding this button while the DualGrip is powered on will cause it to power off.
- 3, 4. **NAVIGATION Buttons:** These buttons are located just below the screen on either side of the Power/Menu/Select button and are used to navigate the various screens and menus.

Note: Where necessary, pressing and holding a navigation button performs the advanced action noted at the corner of the corresponding side of the screen.

5. **Wrist Strap:** Simply place hand through the tied strap before grasping the handle to protect the instrument from damage if dropped.
6. **Dual-Grip Handle:** The DualGrip features a unique two-position grip handle. Easily repositioned using a simple turning motion and locked using provided hex key.
7. **Hex Key Slot:** Magnetic retention storage slot for handle locking hex key.

Note
If the DualGrip freezes, perform a hard power reset by holding both left and right navigation buttons until the unit resets.



Repositioning Grip Handle

The DualGrip features a unique two-position grip handle. The handle is easily repositioned using a simple turning motion and locked using provided hex key.

Step 1: Retrieve Hex Key

A 3/32" x 2" Hex key is magnetically-retained in a storage slot in the DualGrip's base.

Step 2: Unlock Handle

Using hex key, rotate the labeled set screws counter-clockwise about 1 full revolution to unlock the grip handle. Note: 3/32" Hex screws are located on each side of the grip handle.

Step 3: Rotate Handle

Once unlocked and free to rotate, turn the grip handle until the opposite side is facing outward. A small click will be heard when the rotation is complete.

Step 4: Lock Handle

Once repositioned, use hex key to rotate the labeled set screws clockwise about 1 full revolution to lock the grip handle. A simple tightening of each hex screw is enough to lock the handle securely in place.

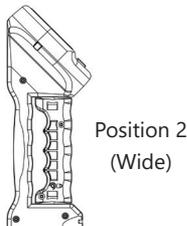
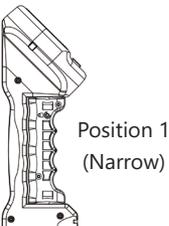
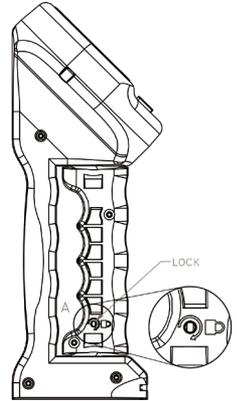
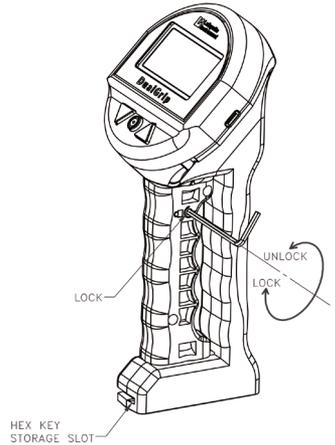
Step 5: Return Hex Key

Return hex key to storage slot in the DualGrip's base.

Step 6: Update Test Setup

Ensure appropriate position is noted in test setup before running another test. Grip handle position is set in the Test Setup menu with the corresponding values.

1. Narrow - designed for smaller hands
2. Wide - designed for larger hands



Screens

Pre-Trial Screen

This screen is displayed before the beginning of each new test. All Trial screens are available by pressing the navigation buttons.



After the dominant hand has been selected, the screen displays information regarding the next trial of the test.

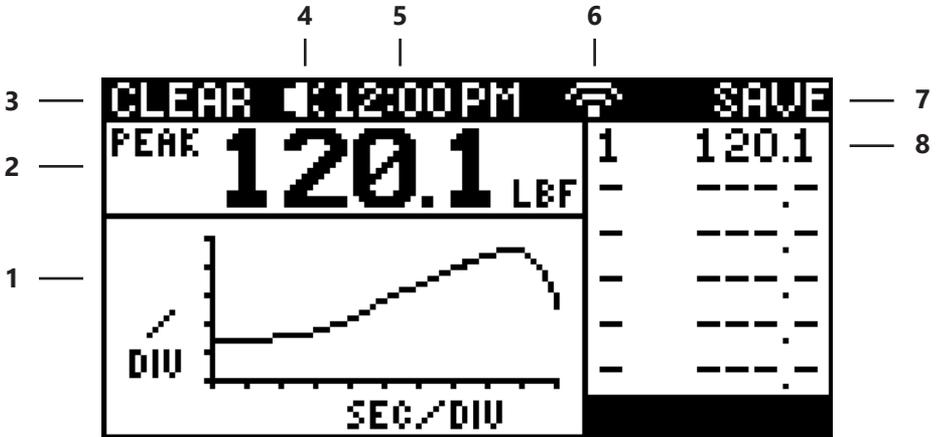
1. **Force over Time Graph Area:** The graph displays the data for the previously conducted trial, and automatically populates the chart to maximize the viewing area. The Y-axis label shows the amount of force in lbs, kg, or N, and the X-axis shows the time in seconds.
2. **Peak Force:** The peak force displays the maximum force during the test and displays what units the force is being measured in lbs, kg, or N.
3. **Clear Test:** Corresponds to holding the DOWN navigation button
4. **Speaker Indicator:** Indicates status of the speaker (ON or OFF)
5. **Current Time:** Displays current time based on time values entered into settings
6. **Wireless Indicator:** Indicates status of the wireless (ON or OFF)
7. **Save Test:** Corresponds to holding the UP navigation button
8. **Hand:** Displays the current hand that is to be tested (DOM or N.DOM)
9. **Position:** Numeric setting of the handle (1: narrow, 2: wide)
10. **Time:** Allotted time for each trial of a test
11. **Trial #:** Display of current trial
12. **Starting Force:** Amount of force required to initiate testing
13. **Stop Force:** Amount of force required to end testing

Note

The Power/Menu/Select button can be used to return to the main menu.

Trial Screen

The Main Measurement Screen shows all measurement information that is being captured. All Trial screens are available by pressing the navigation buttons.



- 1. Force over Time Graph Area:** The graph displays the data for the previously conducted trial, and automatically populates the chart to maximize the viewing area. The Y-axis label shows the amount of force in lbs, kg, or N, and the X-axis shows the time in seconds.
- 2. Peak Force:** The peak force displays the maximum force during the test and displays what units the force is being measured in lbs, kg, or N.
- 3. Clear Test:** Corresponds to holding the DOWN navigation button
- 4. Speaker Indicator:** Indicates status of the speaker (ON or OFF)
- 5. Current Time:** Displays current time based on time values entered into settings
- 6. Wireless Indicator:** Indicates status of the wireless (ON or OFF)
- 7. Save Test:** Corresponds to holding the UP navigation button
- 8. Trial Values:** Displays list of previously conducted trial values

Test Setup Menu Screen

The Test Setup menu screen allows the user to select default or custom settings, and setup various test options for each custom setting.

HAND

Select to test DOMINANT or NON-DOMINANT hands.

POSITION

Select the placement of the handle (1 or 2).

Note: The handle must be physically placed in the proper collar to match the position selection.

TEST TIME

Allows users to select maximum time for testing.

TRIALS

Select the amount of trials for each test.

PEAK ONLY

Displays only the peak on the main screen, allowing for quick back-to-back testing.

START FORCE

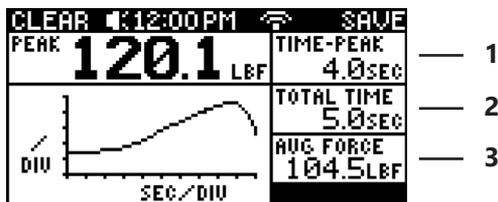
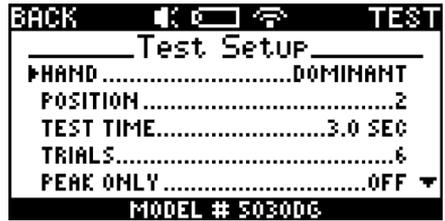
Select force threshold that must be met to begin a trial.

STOP FORCE

Select force threshold that must be met to end a trial.

DISPLAYS 1, 2, 3

Corresponds to the customizable measurement areas on the Test Screen.



DualGrip Digital Dynamometer

Options Menu Screen

The Options menu allows users to customize the setup of their unit.

WIRELESS

Toggles on/off the module for wireless connection.

BACKLIGHT

Toggles unit's backlight on/off.

SOUND

Toggles unit's sound on/off.

UNITS

Allows selection of pounds (lbs), kilograms (kg), or Newtons (N).

Note: Changing the Units in the DualGrip does not change the Units in the LEval app, and, in addition, changing the Units in the LEval app does not change the Units on the dynamometer.

SLEEP

Select idle time before DualGrip shuts down (10-30 minutes).

SAVE DATE/TIME

Toggles saving date/time with the corresponding test data.

DATE

Manually update the DualGrip system date.

TIME

Manually update the DualGrip system time.



Saved Data Menu Screen

The Saved Data menu screen allows users to manage tests that have been saved in the internal memory.



TEST:1			
TRIAL	HAND	PEAK	AUG: 119.6 LBF
1	DOM	119.2 LBF	MIN: 118.9 LBF
2	N.DM	120.5 LBF	MAX: 120.5 LBF
3	DOM	119.1 LBF	HAND: BOTH
4	N.DM	120.2 LBF	POSITION: 2
5	DOM	118.9 LBF	DATE:
			01 JAN 24

Information Menu Screen

The Information menu screen provides a contact email and various information about the DualGrip.

Note: Pressing any button will return to the main menu.



Low Battery Indicator and Charging

The low battery indicator screen is shown when the battery needs to be charged. The screen will appear and then the system will power off. This screen will reappear when the power button is pressed until the unit is recharged via the included USB-C connector. The DualGrip requires approx. 45 minutes to charge to 80% of capacity, or approx. 2 hours for a full charge.

Firmware Updates

Lafayette Instrument periodically updates the firmware for select products. Visit our website to download our Firmware Updater software. The DualGrip can be updated by plugging in the USB charger into your computer and downloading the current version of the firmware via the Firmware Updater.

Cleaning

Hard surfaces can be cleaned with a bleach-free sanitizing wipe. Alcohol wipes may also be used. Cloth or foam surfaces can be cleaned with anti-bacterial soap and water and allowed to air dry. Care must be taken to not allow water to penetrate the enclosure as damage to the circuit may occur.

Disclaimer: These cleaning instructions for Lafayette Instrument products are a recommendation of compatible cleaning materials only. Product end users are responsible for instituting an appropriate cleaning regimen utilizing best practices and techniques. Lafayette Instrument assumes no responsibility for the cleanliness or sanitation of the products after initial use, nor makes any claim that the use of the recommended cleaning materials mitigates all risk of potential cross infection.



L Eval Application

The DualGrip is compatible with the Lafayette L Eval mobile application. The application may be downloaded, for free, from the App Store and Google Play.

The DualGrip pairs directly to the mobile device via Bluetooth. L Eval allows quick and consistent management of large groups of subjects and saving of subject results in a local database for future study. A subject's data can be easily viewed in both raw and printable chart form. Collected data can be used to generate specific norms for all user data or at an organization level.

More specific usage details are available in the L Eval application's Help Menu. The Help Menu is accessed by tapping the pull-down menu icon on the upper right hand corner of the application and selecting "Help" from the menu.



Internet Access

Internet access is required for initially downloading the application, as well as retrieving any additional updates from the App Store or Google Play. *Internet access is not required for day-to-day usage or pairing.*



Apple and the Apple logo are trademarks of Apple Inc., registered in the U.S. and other countries. App Store is a service mark of Apple Inc., registered in the U.S. and other countries.

Google Play and the Google Play logo are trademarks of Google Inc.

Pairing to LEval Application

To pair with the mobile device, power on the DualGrip. From the Menu screen, scroll down to Options and press the Menu/Select button.

From the Options menu, scroll down to “Wireless” using the Up/Down arrows and then press the Menu/Power/Select button to highlight the cursor. Use the Up/Down arrows again to make your selection of On/Off. Once the wireless indicator is On, press the Menu/Power/Select button again. The Wireless symbol will be displayed at the top of the display.



When the DualGrip has successfully connected, the application’s Connection Bar will display the name of the connected DualGrip with the current battery level. The connected DualGrip will state “Connected to App”.

App Pairing Instructions

Once the wireless symbol is displayed, it is recommended to follow the instructions available in the current version of the LEval application in order to pair with the DualGrip. Connection details are available from the LEval navigation menu by selecting “Connect”.

Control via LEval App

When the DualGrip is connected to the LEval app, it can only be controlled via the LEval app. The DualGrip returns to the test setup screen when it is no longer paired.

Appendix A: Suggested Grip Strength Protocols

There are numerous protocols for measuring grip strength. Lafayette Instrument has designed our DualGrip and application to accommodate for a wide range of options and protocols. These are suggested protocols for each test based on various research and experience. Usage of the LEval application is recommended where repetition and/or data storage is required.

The Handshake Position

For each of the following test protocols, the subject should be seated in a standard chair with its feet flat on the floor. The subject's shoulders should be adducted with the wrist placed in a neutral grip position and elbow flexed at 90 degrees and tucked into the subject's side. This position is colloquially known as the "Handshake Position" and will be referred to as such in the remainder of this manual.

Peak Force

Begin the test with the subject sitting in the "Handshake Position" with the DualGrip in the dominant hand. Instruct the subject to slowly squeeze the handle, working up to maximum grip strength. Allow enough time for the subject to reach maximum grip strength and then instruct the subject to stop.

If necessary, repeat the procedure based on the chosen test parameters. We recommend repeating the procedure alternating from the dominant hand to the non-dominant hand with 30 seconds of rest in between trials (three readings per hand in total).

Rapid Exchange

Begin the test with the subject sitting in the "Handshake Position." Instruct the subject to rapidly squeeze the DualGrip, exerting maximum effort with each squeeze. The administrator should move the dynamometer back and forth between the dominant hand and non-dominant hand to the cadence (suggested 80 bpm) selected in the LEval application.

If necessary, repeat the procedure based on the chosen test parameters. We recommend repeating for 10 repetitions per hand (20 repetitions in total). The LEval application will record each repetition.

Force Over Time/Threshold Test

Begin the test with the subject sitting in the "Handshake Position." Instruct the subject to either maintain maximum grip strength for the duration of the test or to watch the application and attempt to maintain their grip strength above the selected threshold level. The LEval application can be used to set the Threshold force.

If necessary, repeat the procedure based on the chosen test parameters. We recommend repeating the procedure, alternating from the dominant hand to the non-dominant hand with 30 seconds of rest in between trials (three readings per hand in total).

Appendix B: Normative Data

Dynamometer readings recorded in kilograms on the Test Record for the three trials on each hand.

Table 1: Dominant Hand

<i>Age Group (Years)</i>	Male			Female		
	<i>Count</i>	<i>Mean</i>	<i>SD</i>	<i>Count</i>	<i>Mean</i>	<i>SD</i>
4-5	8	5.23	3.24	9	5.10	2.59
5-10	58	13.05	5.68	48	11.31	4.96
10-15	31	25.34	9.02	36	19.50	6.31
15-20	34	44.73	10.98	35	27.32	5.66
20-25	26	50.28	10.10	26	31.06	8.90
25-30	19	50.23	11.18	17	30.02	3.93
30-35	17	54.98	9.53	18	29.48	6.60
35-40	21	48.48	10.10	19	32.47	5.99
40-45	22	55.82	13.16	20	31.45	6.26
45-50	18	57.78	11.39	19	30.04	4.21
50-55	9	49.26	13.25	11	28.42	7.36
55-60	12	48.31	9.34	9	26.85	4.53
60-65	9	43.04	14.28	8	29.58	17.18
65-70	10	37.50	11.43	9	21.85	6.91
70-75	9	30.74	8.20	7	21.10	3.45
75-80	8	30.96	6.59	9	22.67	8.29
80-100	11	23.97	5.27	19	17.75	6.73

Table 2: Non-Dominant Hand

<i>Age Group (Years)</i>	Male			Female		
	<i>Count</i>	<i>Mean</i>	<i>SD</i>	<i>Count</i>	<i>Mean</i>	<i>SD</i>
4-5	8	4.63	3.36	9	5.29	1.63
5-10	58	12.05	4.92	48	10.60	5.08
10-15	31	23.27	8.44	36	18.05	5.83
15-20	34	41.89	9.92	35	24.72	5.71
20-25	26	47.08	8.48	26	30.22	9.01
25-30	19	47.63	10.68	17	27.84	3.62
30-35	17	52.41	10.43	18	26.94	6.88
35-40	21	47.06	9.31	19	30.23	5.75
40-45	22	53.77	13.95	20	29.30	5.96
45-50	18	55.52	13.15	19	28.98	4.90
50-55	9	45.48	10.83	11	28.58	6.40
55-60	12	46.97	9.54	9	26.37	3.73
60-65	9	40.04	13.42	8	29.46	15.93
65-70	10	35.33	7.91	9	20.59	6.67
70-75	9	28.63	8.10	7	19.52	2.52
75-80	8	29.63	6.59	9	21.89	6.97
80-100	11	23.42	4.53	19	17.04	7.28

Table 3: Stratified by Large Age Groups

This table contains data averaged from Tables 1 and 2.

<i>Age Group (Years)</i>	Male			Female		
	<i>Count</i>	<i>Mean</i>	<i>SD</i>	<i>Count</i>	<i>Mean</i>	<i>SD</i>
<i>Dominant Hand</i>						
4-10	72	12.59	6.05	66	11.19	5.02
11-24	83	41.26	13.96	88	26.54	7.87
25-49	99	53.10	11.58	93	30.73	5.53
50-100	68	37.84	13.37	72	23.29	9.15
<i>Non-Dominant Hand</i>						
4-10	72	11.70	5.51	66	10.47	5.12
11-24	83	38.43	13.07	88	24.73	7.96
25-49	99	50.91	11.99	93	28.70	5.55
50-100	68	35.87	12.18	72	22.64	8.90

Appendix C: Symbol Glossary

The following glossary describes the symbols included on the device label. Some symbols may not apply to this device.

	<p>Manufacturer Indicates the medical device manufacturer <i>ISO 15223-1:2016 Ref. 5.1.1</i></p>		<p>Authorized Representative Indicates authorized representative in the EU <i>ISO 15223-1:2016 Ref. 5.1.2</i></p>
	<p>Date of Manufacture Indicates date when device was manufactured <i>ISO 15223-1:2016 Ref. 5.1.3</i></p>		<p>Use by Date Indicates date after which the device is not to be used <i>ISO 15223-1:2016 Ref. 5.1.4</i></p>
	<p>Batch Code Identifies the manufacturer's lot or batch code <i>ISO 15223-1:2016 Ref. 5.1.5</i></p>		<p>Catalog Number Indicates the manufacturer's part number <i>ISO 15223-1:2016 Ref. 5.1.6</i></p>
	<p>Serial Number Identifies the manufacturer's serial number <i>ISO 15223-1:2016 Ref. 5.1.7</i></p>		<p>Sterile Indicates that a device has been subject to sterilization <i>ISO 15223-1:2016 Ref. 5.2.1</i></p>
	<p>Do not use if package is damaged Indicates device should not be used if opened <i>ISO 15223-1:2016 Ref. 5.2.8</i></p>		<p>Non-Sterile Indicates a device has not been subject to sterilization <i>ISO 15223-1:2016 Ref. 5.2.7</i></p>
	<p>Fragile, handle with care Indicates device that needs careful handling <i>ISO 15223-1:2016 Ref. 5.3.1</i></p>		<p>Keep away from sunlight Indicates a device needs protection from sunlight <i>ISO 15223-1:2016 Ref. 5.3.2</i></p>
	<p>Temperature limit Indicates upper and lower temperature limits <i>ISO 15223-1:2016 Ref. 5.3.7</i></p>		<p>Keep dry Indicates device should be protected from moisture <i>ISO 15223-1:2016 Ref. 5.3.4</i></p>
	<p>Do not reuse Indicates a single use device <i>ISO 15223-1:2016 Ref. 5.4.2</i></p>		<p>Consult Instructions for use Prompts the user to consult the user manual <i>ISO 15223-1:2016 Ref. 5.4.3</i></p>
	<p>Contains latex Indicates the presence of natural rubber latex <i>ISO 15223-1:2016 Ref. 5.4.5</i></p>		<p>Caution Indicates the need to review cautionary information <i>ISO 15223-1:2016 Ref. 5.4.4</i></p>
	<p>Humidity Limitation Indicates the upper and lower limits of humidity <i>ISO 15223-1:2016 Ref. 5.3.8</i></p>		<p>CE Mark Product is certified for sale in the EU <i>Regulation (EC) No. 765/2008 Annex II</i></p>
	<p>Made in the USA Device was manufactured in the USA <i>No Standard Applicable</i></p>		<p>Medical Device Enclosed equipment is classified as a medical device <i>No Standard Applicable</i></p>

Appendix D: FCC Compliance Statement

Contains FCC ID: A8TBM78ABCDEF GH

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.

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 into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The FCC ID for the DualGrip is available via the device menu by selecting MENU > INFORMATION.

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Terms and Conditions

Worldwide Headquarters

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Placing an Order

All orders need to be accompanied by a copy of your purchase order. All orders must include the following information:

- Quantity
- Part Number
- Description
- Purchase order number or method of pre-payment
- Tax status (include tax-exempt numbers)
- Shipping address for this order
- Billing address for the invoice we'll mail when this order is shipped
- Telephone number
- Email address
- Signature and typed name of person authorized to order these products

Exchanges and Refunds

No item may be returned without prior authorization from Lafayette Instrument Company and a Return Materials Authorization (RMA#) number which must be affixed to the shipping label of the returned goods. The merchandise should be packed well and insured for the full value. Unopened merchandise may be returned prepaid within thirty (30) days after receipt of the item and in the original shipping carton. Collect shipments will not be accepted. Product must be returned in saleable condition, and credit is subject to inspection of the merchandise.

Repairs

Instrumentation may not be returned without first receiving a Return Materials Authorization Number (RMA). When returning instrumentation for service, please contact Lafayette Instrument to receive an RMA number. Your RMA number will be good for 30 days. Address the shipment to:

Lafayette Instrument Company
RMA# XXXX
3700 Sagamore Parkway North
Lafayette, IN 47904, USA.

Shipments cannot be received at the PO Box. All items should be packed well and insured for full value. An estimate of repair will be given prior to completion. We must receive a copy of your purchase order via email before non-warranty repair work can commence.

Damaged Goods

Damaged instrumentation should not be returned to Lafayette Instrument prior to a thorough inspection. If a shipment arrives damaged, note damage on delivery bill and have the driver sign it to acknowledge the damage. Contact the delivery service, and they will file an insurance claim. If damage is not detected at

the time of delivery, contact the carrier/shipper and request an inspection within 10 days of the original delivery. Please contact the Lafayette Instrument Customer Service Department for repair or replacement of the damaged merchandise.

Limited Warranty

Lafayette Instrument Company warrants equipment to be free of defects in material and workmanship for a period of one year from the date of shipment, except as provided hereinafter. This assumes normal usage under commonly accepted operating parameters and excludes consumable products.

Warranty period for repairs or used instrumentation purchased from Lafayette Instrument is 90 days. Lafayette Instrument Company agrees either to repair or replace, at its sole option and free of part charges to the customer, instrumentation which, under proper and normal conditions of use, proves to be defective within the warranty period. Warranty for any parts of such repaired or replaced instrumentation shall be covered under the same limited warranty and shall have a warranty period of 90 days from the date of shipment or the remainder of the original warranty period whichever is greater. This warranty and remedy are given expressly and in lieu of all other warranties, expressed or implied, of merchantability or fitness for a particular purpose and constitutes the only warranty made by Lafayette Instrument Company.

Lafayette Instrument Company neither assumes nor authorizes any person to assume for it any other liability in connection with the sale, installation, service or use of its instrumentation. Lafayette Instrument Company shall have no liability whatsoever for special, consequential, or punitive damages of any kind from any cause arising out of the sale, installation, service or use of its instrumentation.

All products manufactured by Lafayette Instrument Company are tested and inspected prior to shipment. Upon prompt notification by the Customer, Lafayette Instrument Company will correct any defect in warranted equipment of its manufacture either, at its option, by return of the item to the factory, or shipment of a repaired or replacement part. Lafayette Instrument Company will not be obliged, however, to replace or repair any piece of equipment, which has been abused, improperly installed, altered, damaged, or repaired by others. Defects in equipment do not include decomposition, wear, or damage by chemical action or corrosion, or damage incurred during shipment.

Limited Obligations Covered by this Warranty

1. Shipping charges under warranty are covered only in one direction. The customer is responsible for shipping charges to the factory if return of the part is required.
2. This warranty does not cover damage to components due to improper installation by the customer.
3. Consumable and or expendable items, including but not limited to electrodes, lights, batteries, fuses, O-rings, gaskets, and tubing, are excluded from warranty.
4. Failure by the customer to perform normal and reasonable maintenance on instruments will void warranty claims.
5. If the original invoice for the instrument is issued to a company that is not the company of the end user, and not an authorized Lafayette Instrument Company distributor, then all requests for warranty must be processed through the company that sold the product to the end user, and not directly to Lafayette Instrument Company.

