

MPT-250C Wire Crimp Pull Tester

User Guide

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To Our Valued Customers...

“We are committed to Daniels Manufacturing Corporation (DMC) remaining the major supplier of high reliability tools and maintenance kits for electronic wiring systems to the global aerospace, military, transportation, electrical, and electronic industries through our continuous improvement of all of our business practices and processes while, at the same time, maintaining the economic viability of our business.”

George Daniels, President

To meet this commitment, Daniels Manufacturing Corporation maintains an ISO9001/AS9100 registered Quality Management System.

User Notes:

For the most current information on this or our other products, please contact our Customer Service Department (located in Orlando, Florida USA) directly at 407-855-6161, or via email at dmc@dmctools.com, or visit our website for more information at www.dmctools.com today.

“We’re here to help YOU”

MPT-250C Serial Number _____

Placed into Service on this Date _____

Safety

The MPT-250C Simple Data Capture Program when used in conjunction with the MPT-250C can be Hazardous if not used with caution.

During tests, please pay attention to the tool and then the software!

The MPT-250C can exert up to 250 lbf (pounds of force)

250 lbf \approx 113.4 kgf \approx 1112 N

CAUTION: Please Follow Instructions and Warnings with regard to pinch and flying debris hazards.



Eye protection is required!



Test samples may shatter when they break, fail, or separate.

Do not overload the gear motor! The pull tester can exceed the load limits of the load cell component in this device. For your protection the MPT-250C has been factory set to stop if the peak force exceeds 250 lbf.

If the tool becomes inoperable or jammed for any reason, press the "STOP" button, and then press "HOME".



See "SAFETY NOTES" for additional information throughout this manual - accompanied by the "Red Arrow" to the left.

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1.1 Introduction

The MPT-250C is a Motorized Tensile Wire Crimp Pull Tester used to test a crimped contact's or terminal's tensile strength relative to the wire it is crimped to. The unit has a range of 2.5 lbf to 250 lbf, see section 4.0 (Specifications) for more information.

1.2 Product Overview

The MPT-250C has many new features, and is a significant upgrade from our industry workhorse, the MPT-250B that you've used and trusted for many years.

- 2 Test Types: "Pull to Fail" and "Force Hold"
- Pull Rate / Speeds from 1 to 10 inches per minute (inch / min)
- Force Readout in Pounds Force, Newtons, Kilograms Force (lbf, N, kgf)
- Data Capture Capability (for exporting and further processing test data)
- Intuitive Full Color Touchscreen LCD User Interface
- Horizontal Pull Test Setup
- Low Stance / High Stability Profile
- Manual Mode Operation
- Simple Data Capture Program Included

The portable yet durable design and the rugged construction (machined aluminum and steel) contribute to the versatility and reliability of the MPT-250C Pull Tester, all in a 20 pound, 13 ¼" Wide x 6" High x 11" Deep package.

The MPT-250C has a large, easy to use full color LCD display that features a touchscreen menu, designed for fast and efficient use, allowing the user easy access to pull tester operations and setup. Additionally, the simple 3 button control avoids complex menu systems and allows fast / simple control. The ability to record pull test event data enables the user to monitor your quality standards or even help solve quality issues, thus saving the user time and money.

The user can expect the same precision and dependability that has established ALPHATRON® testers as the first choice for wire harness builders and component suppliers throughout the industry.

A variety of options, including standard and custom grips for all types of wire terminations are available on this tester.

1.3 MPT-250C Operation Overview

The MPT-250C is simple and easy to use with its color LCD Touchscreen display. The unit's fast, easy to use setup, allows the user to choose from two test types: "PULL TO FAIL" or "FORCE HOLD", plus manual control mode, all incorporated into the simple touch screen menu. Current and peak force data is displayed during tests.

Data can be exported via USB (or serial port) to a PC (running Windows 7 or higher) for use in Microsoft Excel, Statistical Process Software, custom software, or even a simple text editor such as Microsoft Notepad. The data is output in plain ASCII text (human readable) "Comma Separated Values" (CSV) which can also easily be imported to Microsoft Excel or other software.

LCD Main Menu, Touch Screen Soft Buttons, and Physical Buttons:

- During "Power On" the Firmware Version is displayed
- Test Type: "PULL TO FAIL" or "FORCE HOLD" (Soft Buttons)
- Speed: 1 inch/min to 10 inch/min (Soft Button)
- Units: "lbf" or "N" or "kgf" (Soft Buttons)
- "CHANGE GRIP" (Soft Button)
- "COM PREFS" or Communications Preferences (Soft Button)
- "MANUAL MODE" (Soft Button)
- "TOUCH CAL" (Soft Button)
- "TEST" (Soft Button)
- "START", "STOP", "HOME" (Physical Buttons)

Please See Section 5.0 (the "Visual Guide to the MPT-250C") for an overview and to familiarize yourself with the MPT-250C and various areas of interest used and described in this manual for proper and safe operation.

NOTIFICATION:

Pull testing is used for verification of the mechanical strength of wire terminations. All pull testing is destructive to wire terminations, insulation, and the installed component. **Wire assemblies which have been pull tested are not recommended for use in a delivered system.**

2.0 Using the MPT-250C

The MPT-250C allows the user to choose between “PULL TO FAIL” or “FORCE HOLD” tests. Additionally, the user may opt for manual control during the testing process.

The user can easily select force testing units including lbf (pound-force), N (newtons), or kgf (kilogram-force) on the LCD touch screen.

A variety of MPT-250C wire and contact grips (and accessories) are available to allow easy wire / contact handling, thus allowing a large variety of testing to be performed.

This user guide / operation manual helps guide the user through the common test types and typical use scenarios of tensile / pull testing.



Front View

NOTE: *Some Items and Accessories attached to the MPT-250C shown in this manual are for illustrative purposes only and, while functionally similar, may differ from Items and Accessories that are delivered with any particular MPT-250C Unit!*

2.1 Power On



SAFETY NOTE: *Make sure no previous test materials are loaded in the unit before power on. Make sure hands, fingers, or any obstructions are moved away from the unit during power on.*

The Power Switch is located on the back / rear panel of the MPT-250C.



Rear View

To power down the MPT-250C unit, Push Power Switch to the “Off Position” (circle) ○

To power up the MPT-250C unit, Push Power Switch to the “On Position” (line) —

The power Switch is located on the back of the unit (Upper Right Side)



When the unit is powered on, the LCD screen identifies the "Firmware Ver X.X" ("1.0" in this example).



NOTE: *The Firmware Version is important information, and may be needed for troubleshooting should it be necessary*

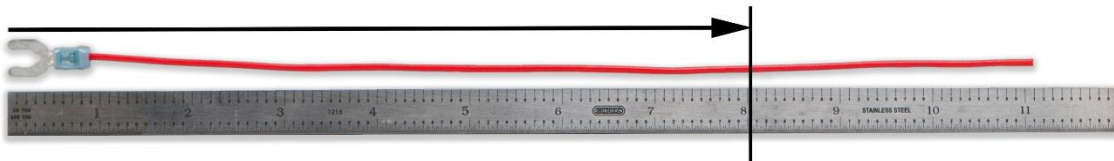
2.2 Test Article / Sample Preparation Loading Overview

IMPORTANT OPERATIONAL INFORMATION

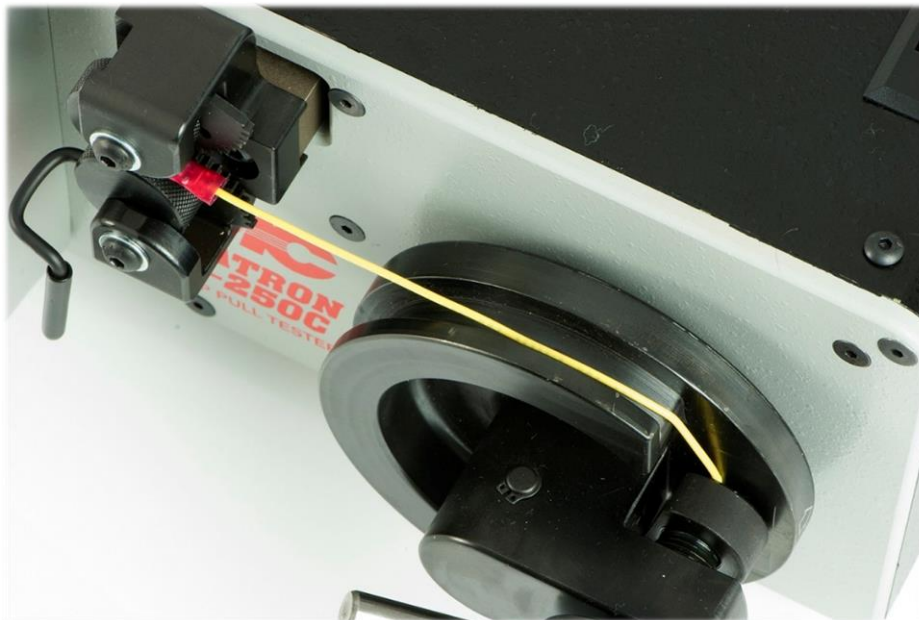
NOTE: *If this is the first time use of the MPT-250C **or** the unit has not been used for an extended period **or** if you have changed a grip, it is suggested that you zero the grip in order to get the most accurate force reading and adjust for any offsets. See “Zero Grip Procedure” Section 2.3 “Pull to Fail Testing” or 2.4 “Force Hold Testing”.*

NOTE: *The “Wire Grip” must be in the “Home” position in order to properly load a sample into the “Wire Grip”. “Home” the unit before performing tests as outlined in sections 2.3 “Pull to Fail Testing” or 2.4 “Force Hold Testing”.*

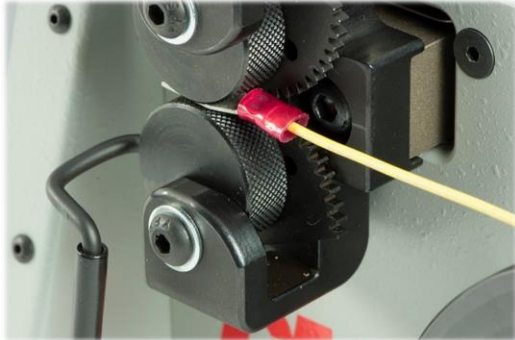
Load wire to be tested (make sure test article is at least 8” or 203mm long)



Secure contact end of wire into the “Contact Grip” (load cell grip) and then wrap wire evenly and firmly (minimizing slack or drooping) around pull wheel to the “Wire Grip” clamping area. Wrapping the wire in this manner insures that the test is performed efficiently and without the need of the pull tester wheel to spend extra time taking up slack. Less slack in your sample setup, makes your exported data compact, since you are not wasting time taking data while the sample starts to come up to tension (i.e. exported data will have less zero force data)



Loading the “Contact Grip”



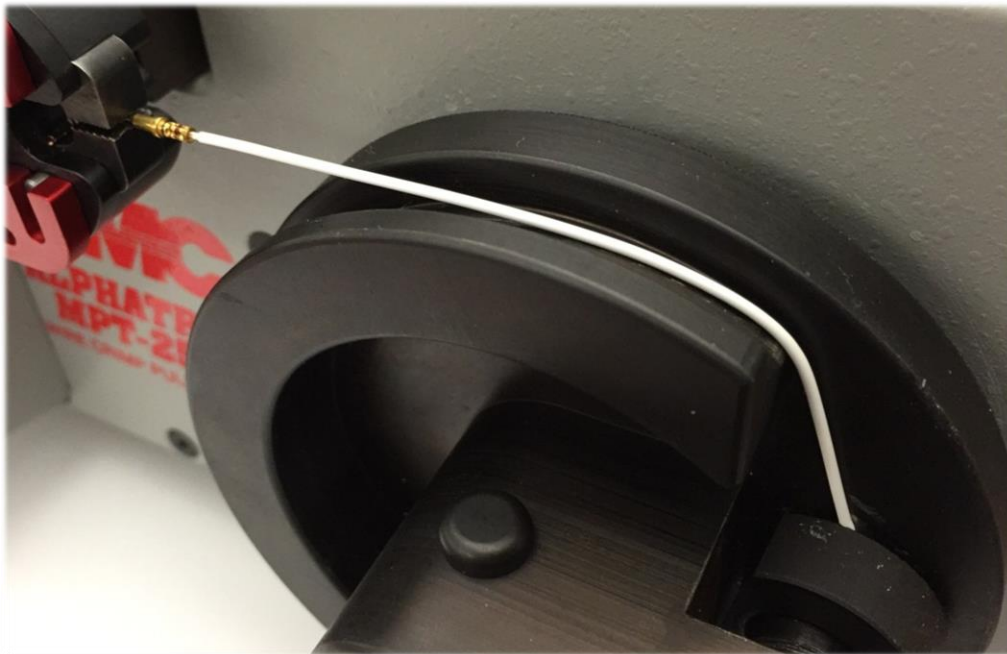
Loading the “Wire Grip”



Pulling handle (away from “Wire Grip”) opens the grip area of the “Contact Grip” for easy contact insertion.

Similarly, the “Wire Grip” lever opens the area in which to insert the wire for easy insertion.

Proper wire placement makes for efficient testing and accurate results when testing! Make sure grips are fastened tightly to the test sample!



Many optional “Contact Grips” and “Wire Grips” are available allowing a broad range of wire pull testing. Please see the Optional Accessories list for MPT-250C accessories in section 4.3.

Now that the wire has been successfully loaded into the MPT-250C we can now start a test.

Zero Grip Procedure

You may need to “zero the grip” in order to compensate for any offset in the current force readings and to make sure the data taken is as accurate as possible, for any of these possible reasons:

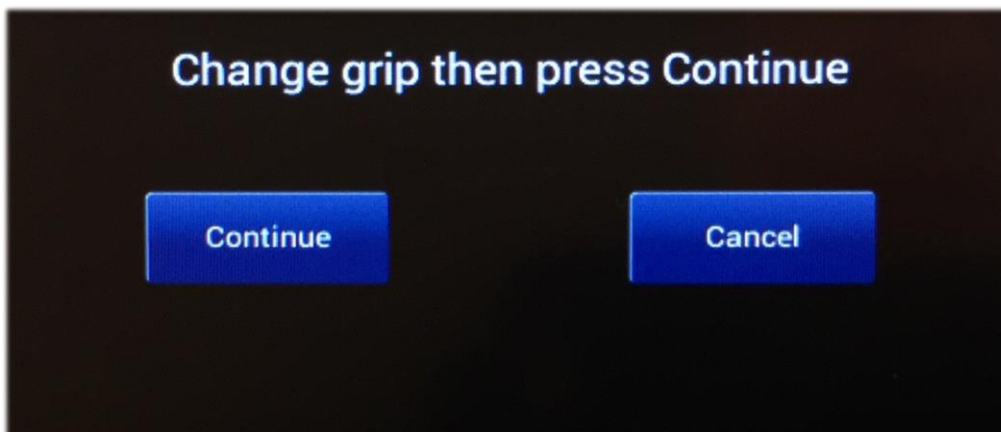
- First time setup of the MPT-250C
- The “CURRENT FORCE” is not within an acceptable tolerance of “zero” force
- The grip has been removed and replaced
- The grip has been changed
- The unit has been in storage

NOTE: Make sure no sample is loaded, and nothing is touching the grip.

From the main “MENU”, Press “CHANGE GRIP”



Then Press “Continue” (or “Cancel”, to cancel the offset compensation)



The offset compensation should occur within about 5 – 10 seconds. If an “Offset Error” occurs you will be instructed to “Contact DMC”.

NOTE: *This will only happen when the unit cannot account for large offsets of more than 1.25 lbf, indicating a gaging problem.*

Alternatively, if you are in “TEST” mode, you can press “ZERO GRIP”



This is the same offset compensation as before; it is also located in this menu, to provide a quick way of zeroing the force offset when in test mode.

2.3 Pull to Fail Testing

NOTE: *The motor will sound audibly different depending on its direction and/or the test force used; this is a normal occurrence when using the unit.*

The “PULL TO FAIL” test is a destructive test, which allows a user to test a sample in tension from 2.5 to 250 lbf.

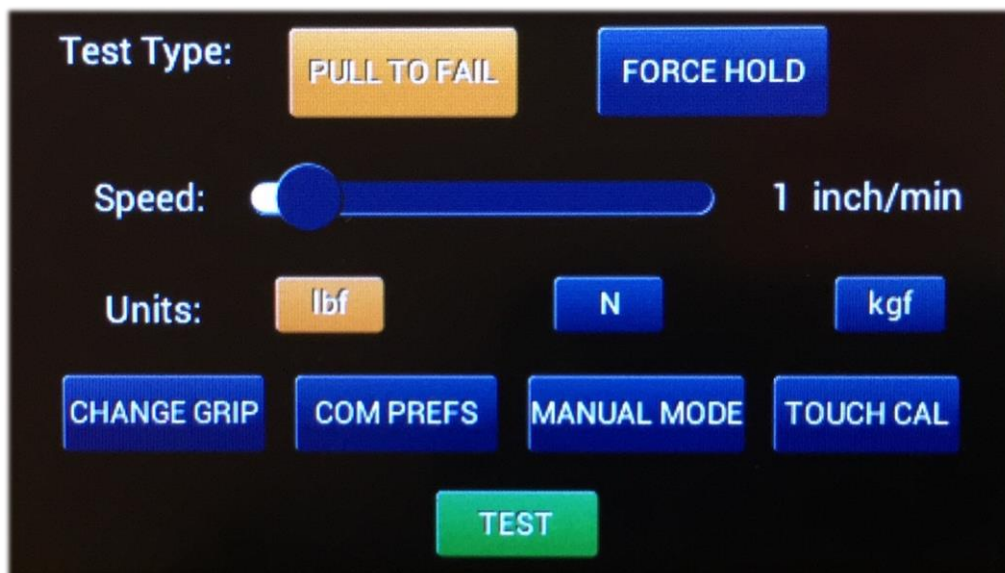
During the test, data is shown in real-time as “Peak force” and “Current Force” on the display.

“Peak force” shows the highest force attained during testing.

“Current Force” shows the force currently applied to the sample at any point during the test.

When a failure occurs, “Break Detected” is indicated and the motor will stop. The tensile “Peak force” exerted on the sample during the test is also indicated and will remain displayed until next test is started.

The main “Menu” on the LCD Touch Screen (selected buttons are displayed orange)



To Begin a “Pull to Fail” test, press “PULL TO FAIL” from the main “Menu” on the LCD Touch Screen



Select test speed by using the speed slide bar. Test speeds from 1 to 10 inch/min are available, in 1 inch/min increments. (1 inch/min is shown in this example)



Select the appropriate units (lbf, N, or kgf) as required by your test procedure parameters, by pressing the desired Units (lbf is shown in this example)

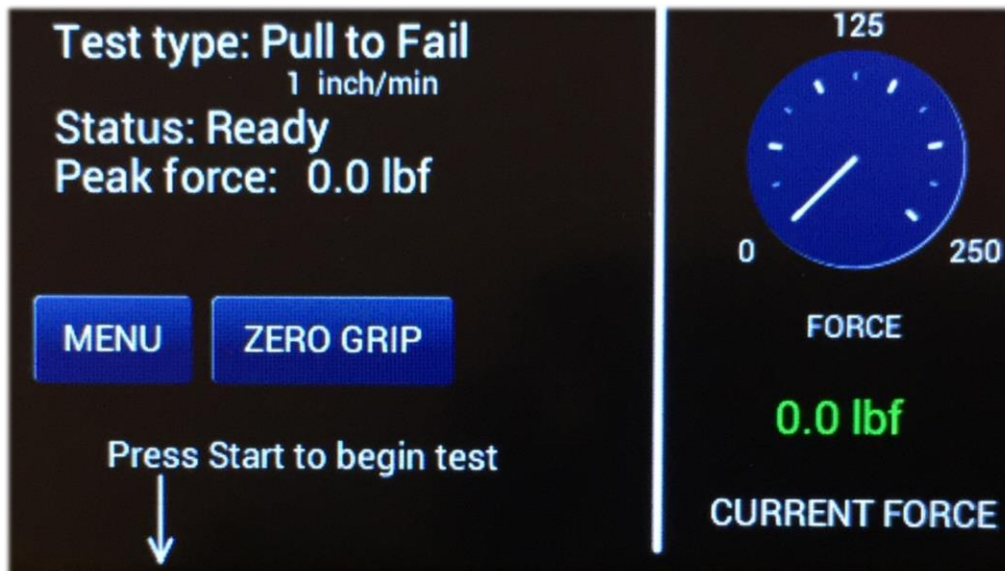


At this point, the Sample to be tested can be loaded into the grips.

Press the “TEST” button to begin testing:



The “TEST” menu



Note: The “Test” menu shows Real-Time Data during a test

The Display will show “Test type” (indicating the test being performed), “Status”, test forces, and the test speed selected. (PULL to FAIL at 1 inch/min is shown in this example)

“**Status**” indicates the status of the current “Test type” in progress, and is followed by current test information. For example:

“**Ready**” indicates the unit is ready for testing

“**Running**” indicates a test in progress

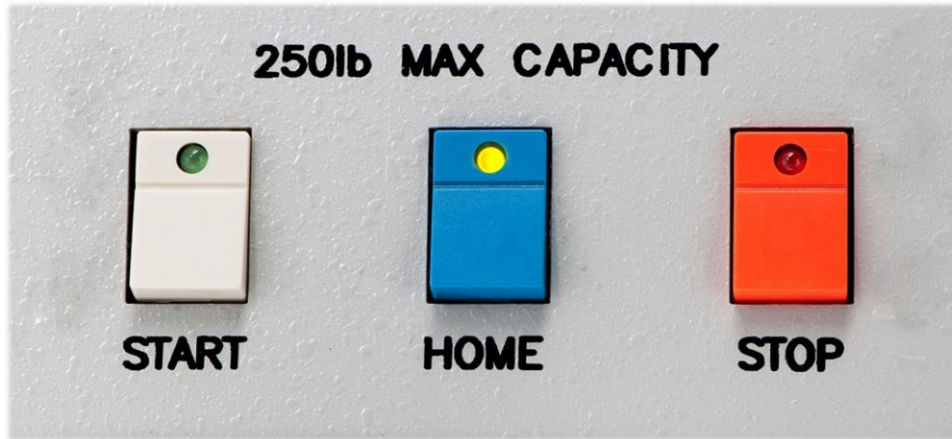
“**Done**” indicates the test is complete

“**Homing**” indicates the wire grip is returning to home position

Pressing “MENU”, returns the user to the main “Menu”



The Physical Control Buttons



NOTE: *When the user starts a test, the user will be prompted to “Home” the unit if the “Wire Grip” is not in the home position.*

Do not load a sample until you have entered test mode and the “Wheel Grip” is in the home position. At initial power on and before a sample is loaded and a test is performed the “Wire Grip” must be in the home position. This ensures that the “Wire Grip” is in the optimum position, as well as keeping the test sample to the shortest preferred length for testing.

The Control Button LEDs will illuminate when the unit is completing the operation requested.

Physical controls operate in conjunction with the touch panel display, and allow the user to initiate predefined actions during testing.

“**START**” Begins a test

“**HOME**” Returns the wire grip to the home position and releases tensile forces after test is complete

“**STOP**” Ends the current test in process and stops the motor

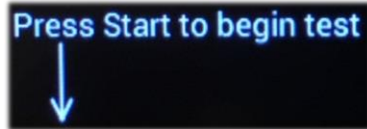
➔ SAFETY NOTE: *Once START button has been pressed Keep hands / fingers clear of test area! Eye protection is required.*

NOTE: *A test cannot be continued or restarted once the “STOP” button is pressed!*

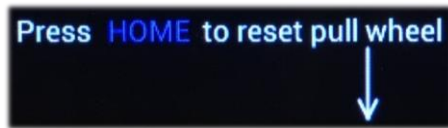
Operator action / direction messages are located on the lower section of the display panel in order to direct the user thru the test process. An arrow will point to the next step of the test and the possible choices the user has during the test

Here are some examples of the operator action / direction messages:

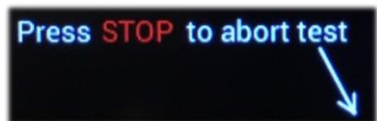
Directs the User to press the “START” button to begin testing; *the test will continue until the sample separates / breaks, the max force is reached, or the user presses the “STOP” button to abort the test.*



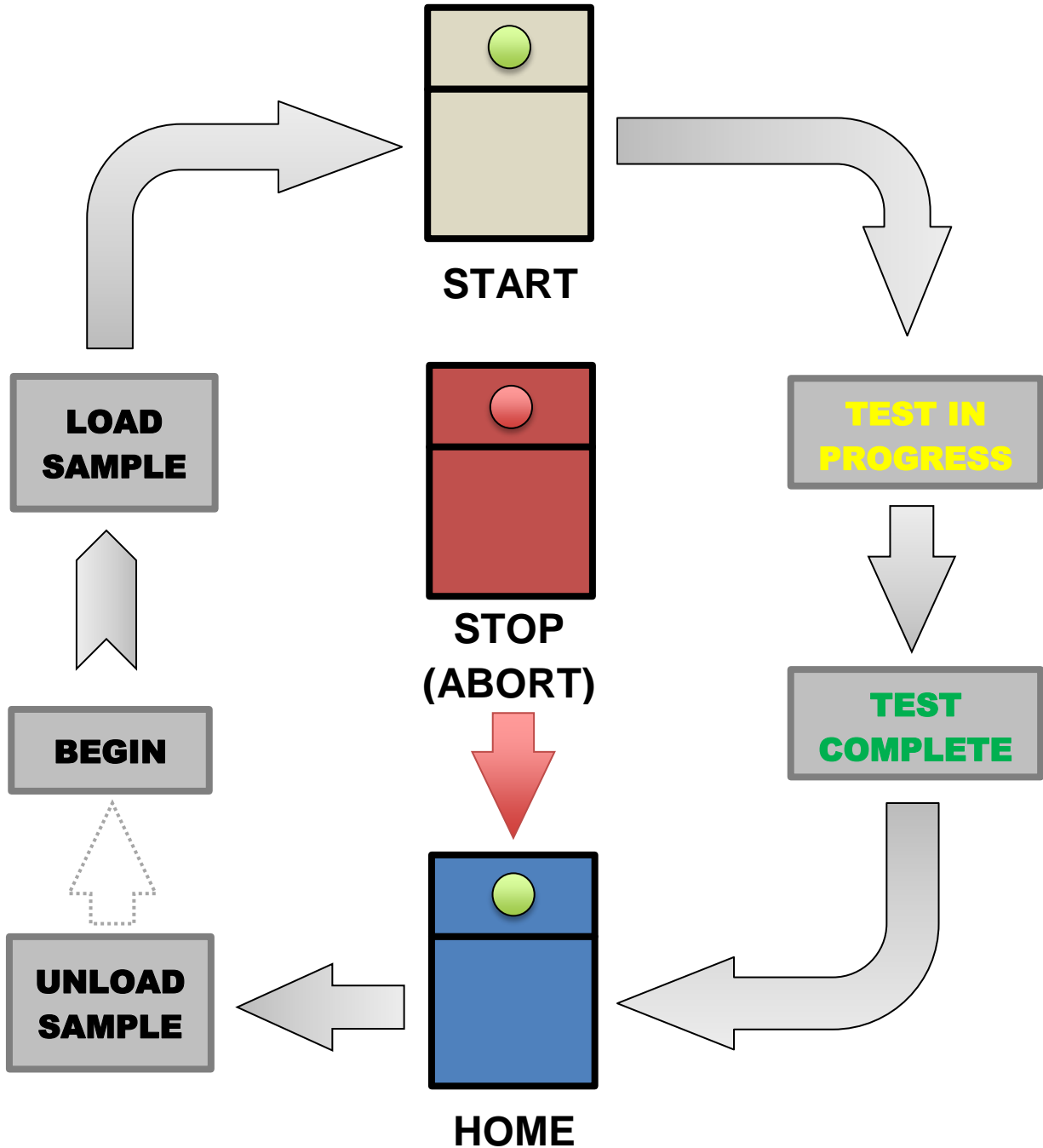
Directs the user to press “HOME” to return the Wire Grip to the home position; *a test will not start if the wire grip is not in the home position.*



Directs the user to press “STOP”; *“STOP” aborts the current test and stops the motor. The Motor will stop and the tension remains until “HOME” is pressed.*



Basic Test Cycle (Pull to Fail)

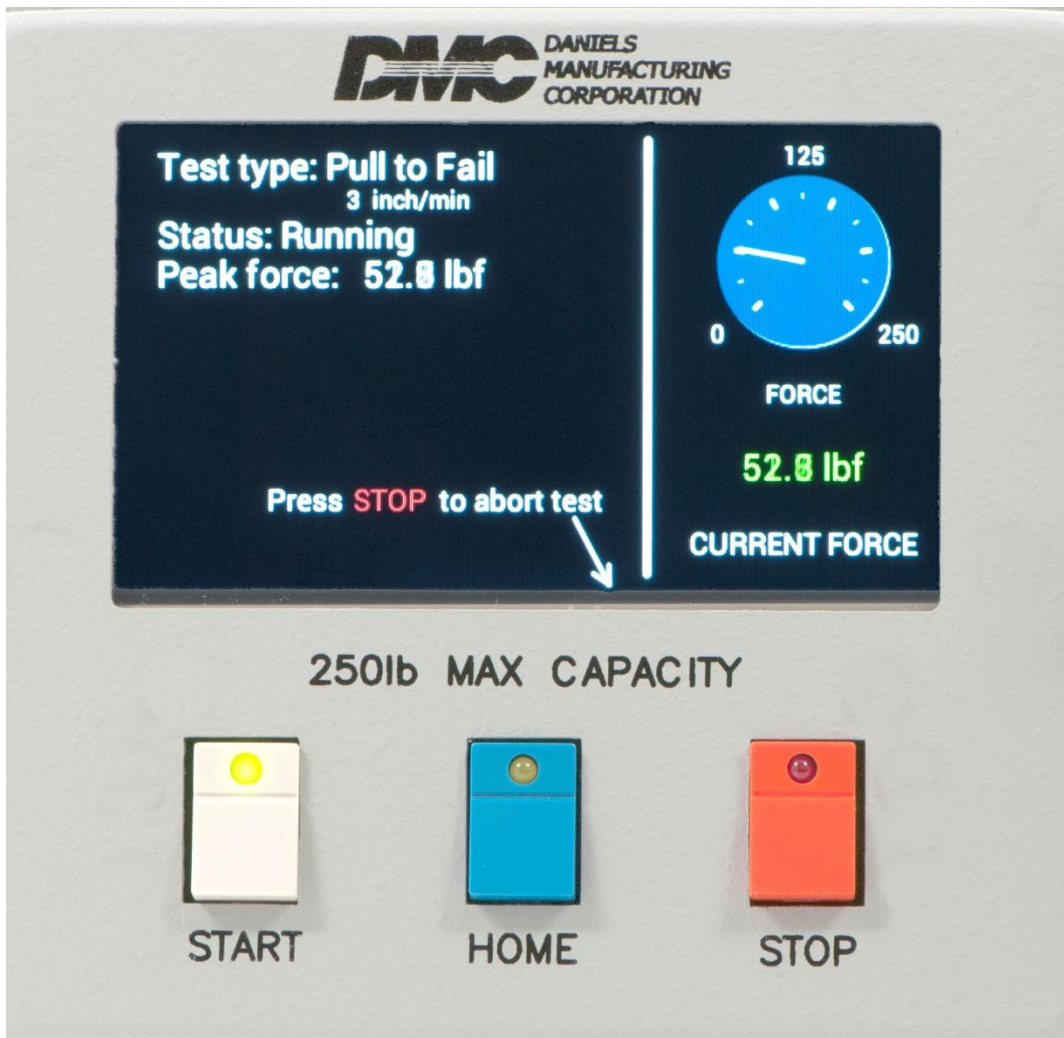


Set test parameters in the main menu (as discussed) and press “TEST” to enter the test menu



Load test sample into the grips. (Refer to section 2.2)

Press the “START” button, “Status” will indicate “Running” and the start LED indicator light will illuminate.



During the test, the “Peak force” and “CURRENT FORCE” (and Dial Indicator on the right side of the LCD Display screen) are real-time displayed values during the test.

Test in progress, Status: “Running”

NOTE: *The user can abort a test in progress, by pressing the “STOP” button.*

Test complete, Status: “Stopped”



If a tensile failure occurs, “Break Detected” is indicated and the peak force is displayed (“Peak force: 67.0 lbf” in this example), and the “STOP” light will illuminate.

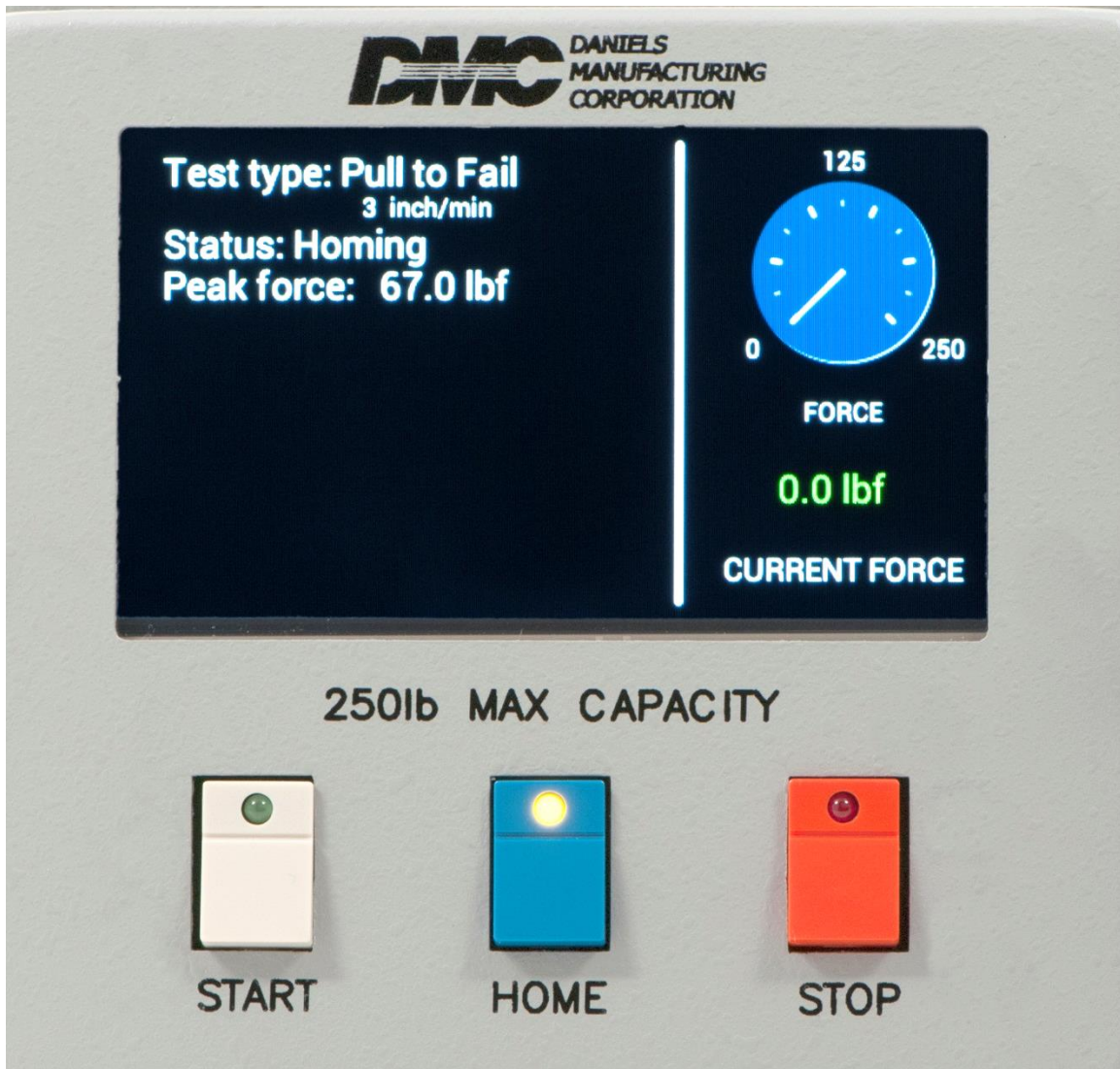
The “CURRENT FORCE” gauge will return to 0.0 lbf (+/-), depending on the failure mode, i.e. complete or partial separation, of sample.

NOTE: Break detect criteria is based upon the sudden drop of $\geq 25\%$ of previous current force value during the test.

Record the data from the test.

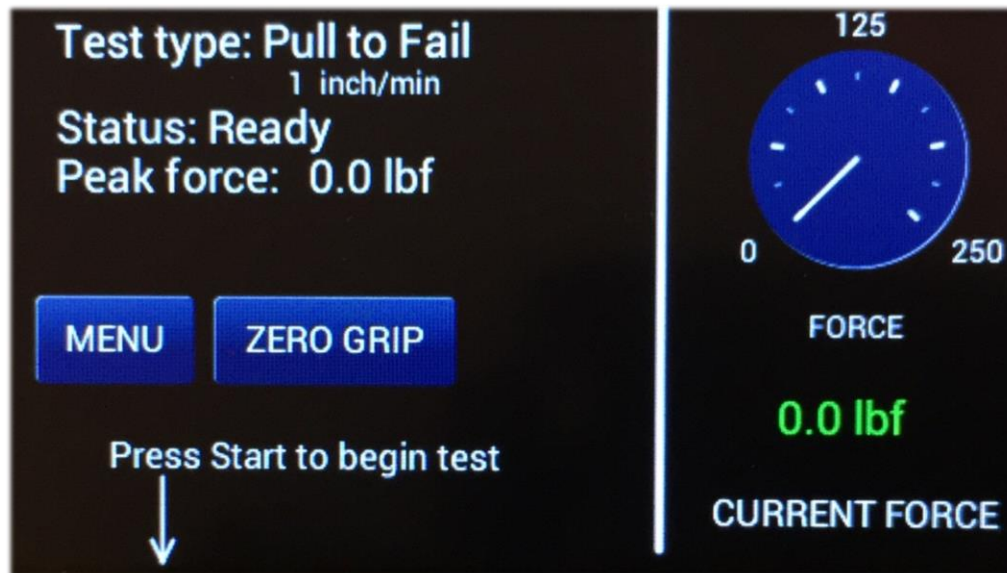
Press “HOME” to prepare the unit for the next test sample (The motor will rapidly reset to its initial position).

During home, the “HOME” indicator will illuminate and status will change to Homing.



After the motor reaches the home position, remove the contact and wire from the “Contact Grip” and “Wire Grip”.

The “TEST” menu



The MPT-250C will now be set back to its initial “Pull to Fail” state, and is ready to begin another test or test type.

2.4 Force Hold Testing

The “FORCE HOLD” test allows a user to test a sample in tension from 5 to 100 lbf, over a user specified time duration (0 to 99 seconds).

During the force hold test, force increases until it reaches the selected force value and then holds that force for the user defined time.

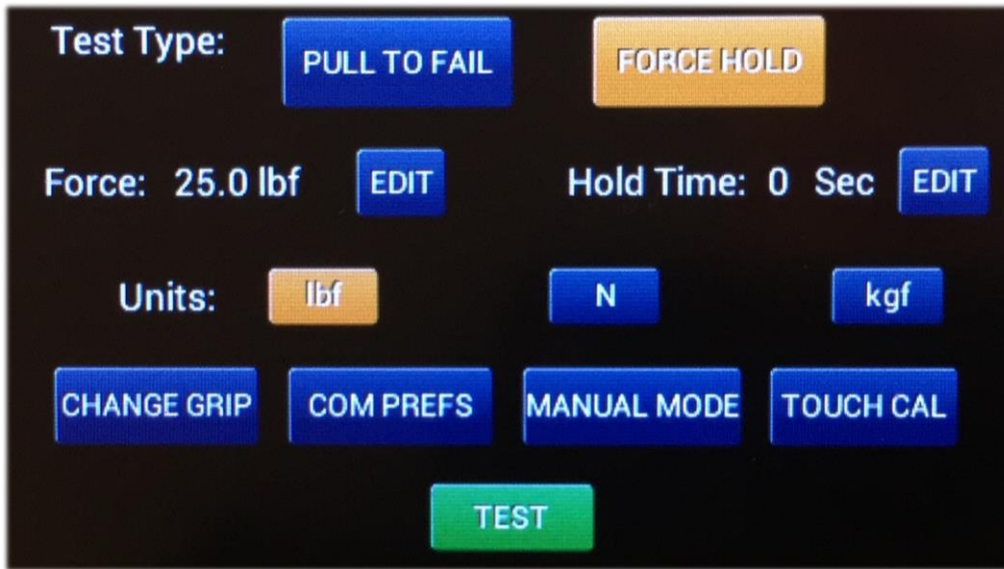
The timer begins when the test force is reached. The motor will start and stop to maintain the test force during the timer.

If the wire pulls out of the contact prior to the time cycle completion or the test never reaches the desired force, then the test is typically considered a failure. Refer to appropriate local and industry standards for detailed failure analysis.

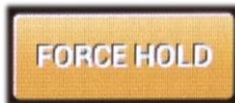
Sample Preparation

Please follow section 2.2 (Test Article / Sample Preparation Loading Overview) to prepare sample and configure grips for testing.

The main “Menu” on the LCD Touch Screen (selected buttons are displayed orange)



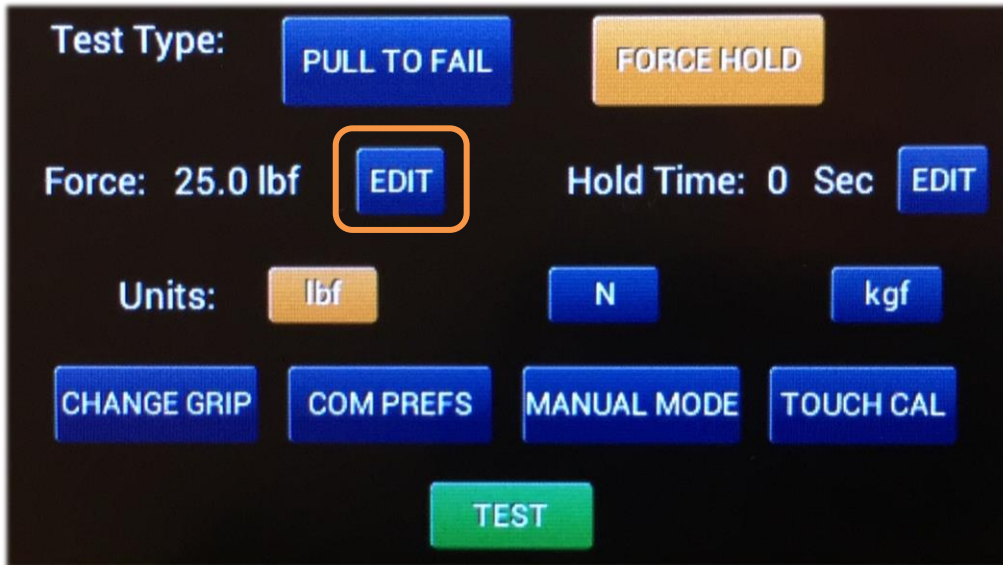
To Begin a Force Hold test, press “FORCE HOLD” from the main “Menu” on the LCD Touch Screen



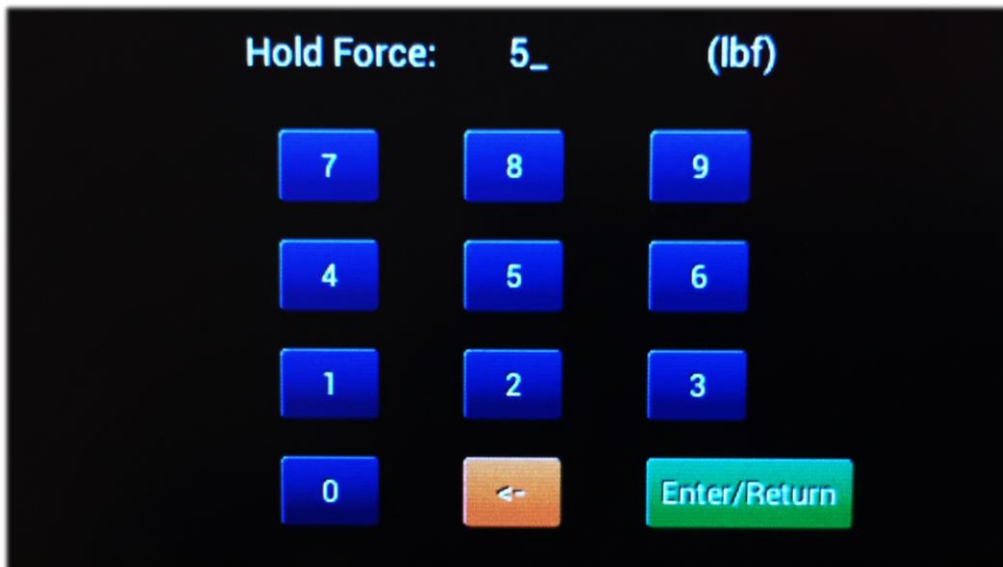
Select the appropriate units (lbf, N, or kgf) as required by your test procedure parameters, by pressing the desired Units (lbf is shown in this example)



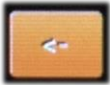
Next, select the “Force” setting by pressing “EDIT” (next to the force value, 25.0 lbf, on the Main menu)



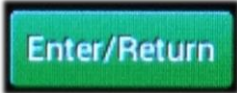
Use the key pad to enter the force value desired (5 lbf for this example)
The “Hold Force” must within the range of 5 and 100 lbf.



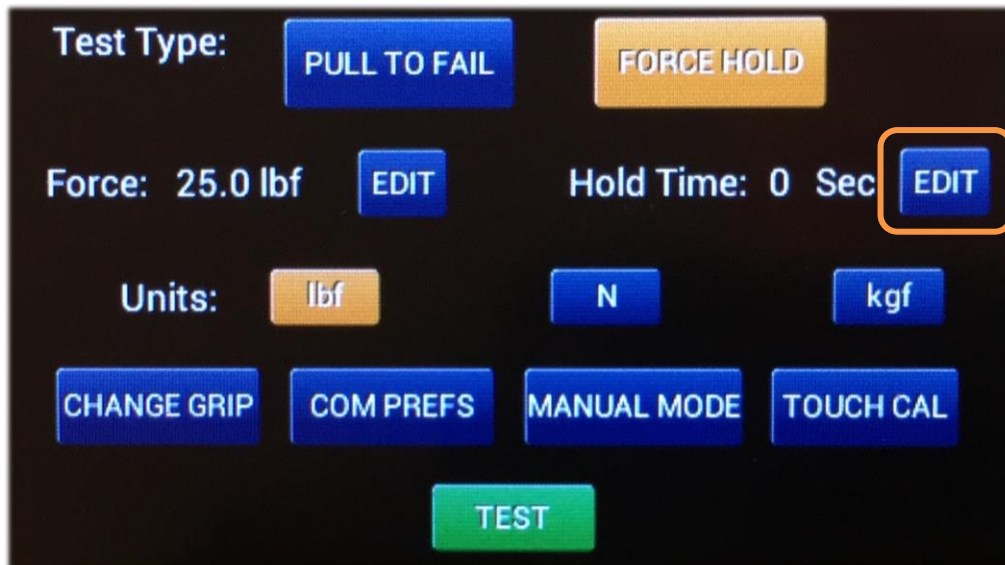
If needed, clear the previous entry using the “Backspace” key



Press “Enter/Return” to store the value and return to the main “Menu”

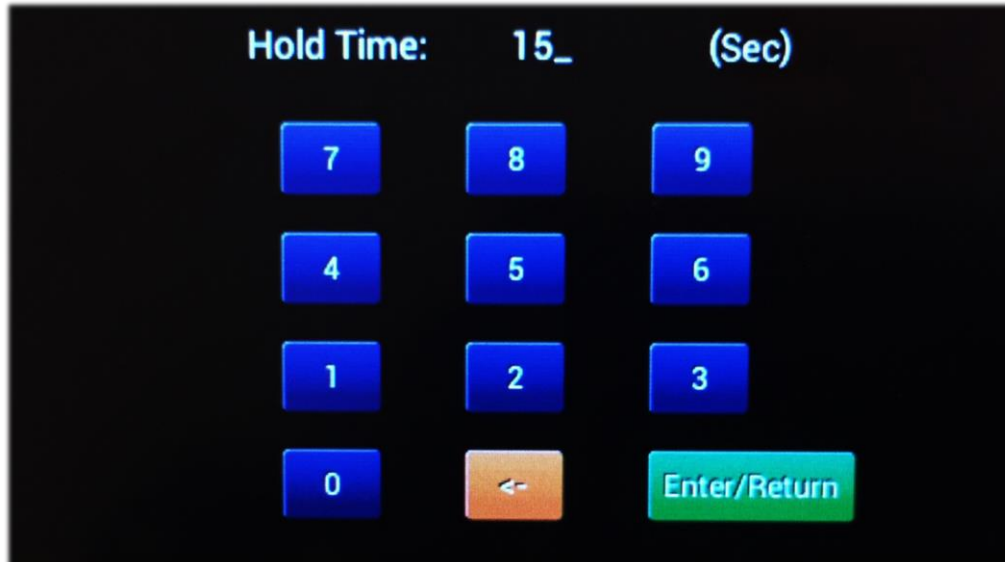


Next, select the desired “Hold Time” setting by pressing “EDIT” (next to the hold time value, 0 sec, on the Main menu)

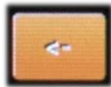


Use the key pad to enter the time value desired (15 sec for this example)

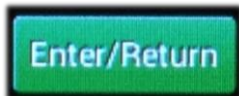
The “Hold Time” must within the range of 0 and 99 seconds.



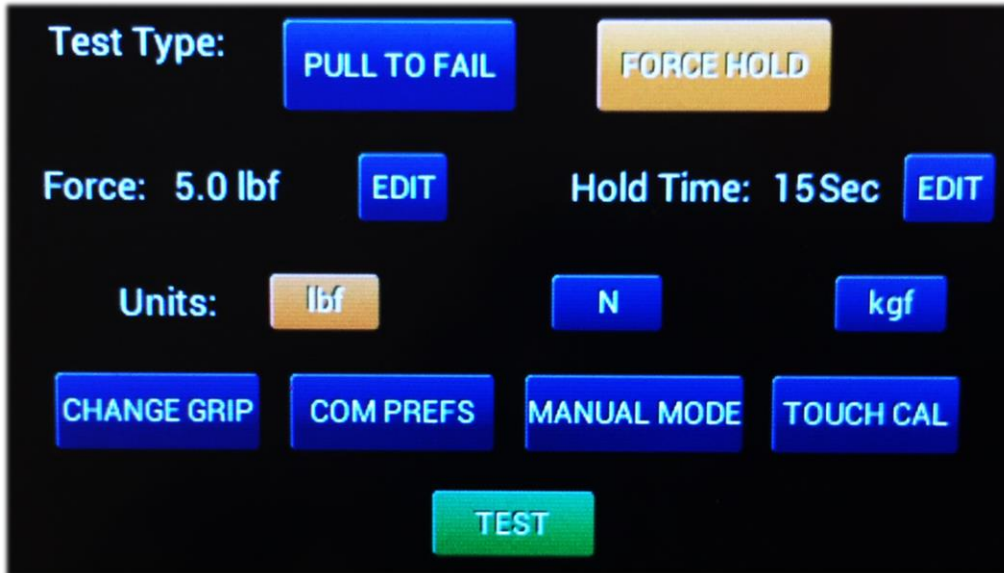
If needed, clear the previous entry using the “Backspace” key



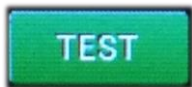
Press “Enter/Return” to store the value and return to the main “Menu”



As shown below, the settings have been made to suit the parameters of the test (“Force: 5.0 lbf” & “Hold Time: 15 Sec” in this example)

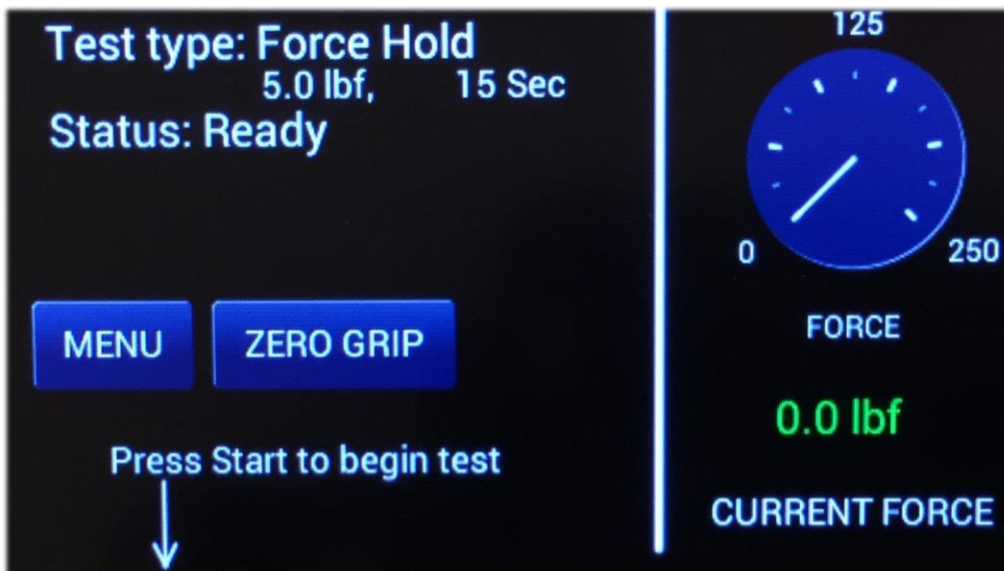


Press the “TEST” button to begin testing



Pressing the “TEST” button, brings up the “Test” menu

The “TEST” menu



The Display will show “Test type” (indicating the test being performed), “Status”, test forces, and time selected. (Force Hold is shown in this example)

NOTE: *No speed is displayed during Force Hold testing. The speed is variable throughout this test, starting quickly, reducing to 1 inch/min as force builds to the point of “Force Hold” (at which time the speed drops to zero).*

“**Status**” indicates the status of the current “Test type” in progress, and is followed by current test information. For example:

“**Ready**” indicates the unit is ready for testing

“**Running**” indicates a test in progress

“**Done**” indicates the test is complete

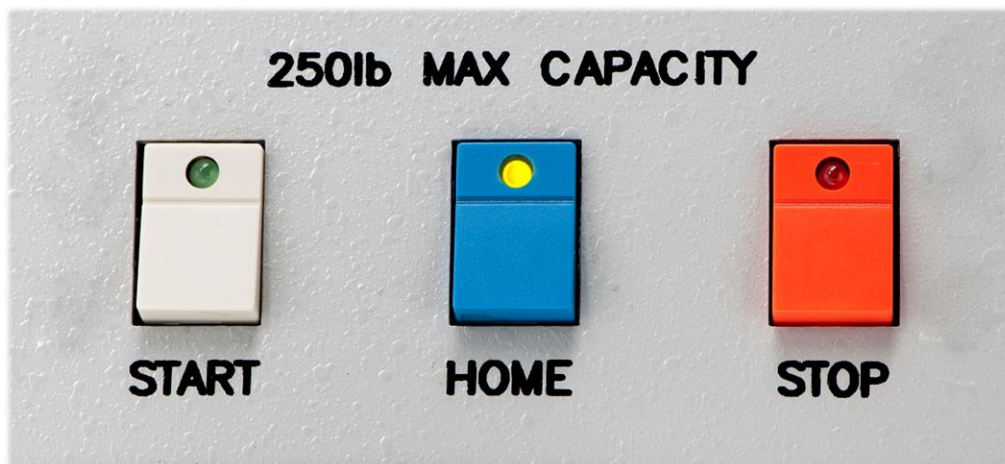
“**Homing**” indicates the wire grip is returning to home position

Pressing “MENU”, returns the user to the main “Menu”



NOTE: *If the user needs to “zero the grip” (remove force offset error), please follow the procedure in section 2.2*

The Physical Control Buttons



NOTE: When the user starts a test, the user will be prompted to “Home” the unit if the “Wire Grip” is not in the home position.

Do not load a sample until you have entered test mode and the “Wire Grip” is in the home position. At initial power on and before a sample is loaded and a test is performed the “Wire Grip” must be in the home position. This ensures that the “Wire Grip” is in the optimum position, as well as keeping the test sample to the shortest preferred length for testing.

The Control Button LEDs will illuminate when the unit is completing the operation requested.

Physical controls operate in conjunction with the touch panel display, and allow the user to initiate predefined actions during testing.

“**START**” Begins a test

“**HOME**” Returns the wire grip to the home position and releases tensile forces after test is complete

“**STOP**” Ends the current test in process and stops the motor

➔ **SAFETY NOTE:** Once **START** button has been pressed Keep hands / fingers clear of test area! **Eye protection is required.**

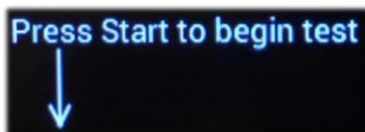
NOTE: A test cannot be continued or restarted once the “**STOP**” button is pressed!

➔ **SAFETY NOTE:** Pressing the stop button will abort the current test and stop the motor. However, tension on the test sample will remain. **Press the “HOME” button to release tension on the test sample.**

Operator action / direction messages are located on the lower section of the display panel and direct the user thru the test process. An arrow will point to the next step of the test and the possible choices the user has during the test.

Here are some examples of the operator action / direction messages:

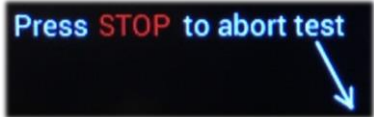
Directs the User to press the “START” button to begin testing; *the test will continue until the sample separates / breaks, the max force is reached, or the user presses the “STOP” button to abort the test.*



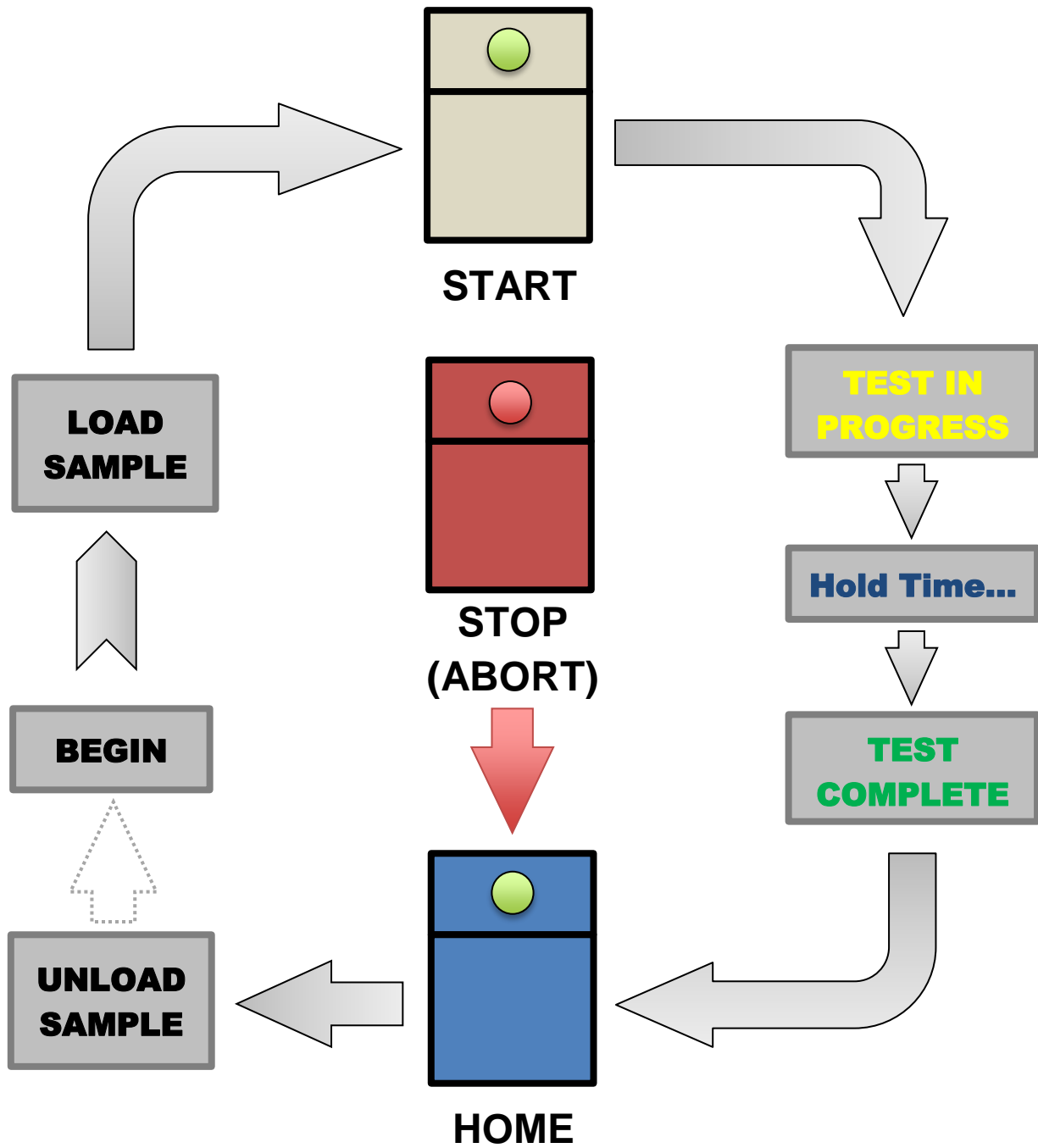
Directs the user to press “HOME” to return the Wire Grip to the home position;
a test will not start if the wire grip is not in the home position.



Directs the user to press “STOP”; *stop aborts the current test and stops the motor.*
The Motor will stop and the tension remains until “HOME” is pressed.



Basic Test Cycle (Force Hold)



Set test parameters in the main menu (as discussed) and press “TEST” to enter the test menu



Load a test sample in into the grips. (Refer to section 2.2)

Press the “START” button, “Status” will indicate “Running” and the start LED indicator light will illuminate.

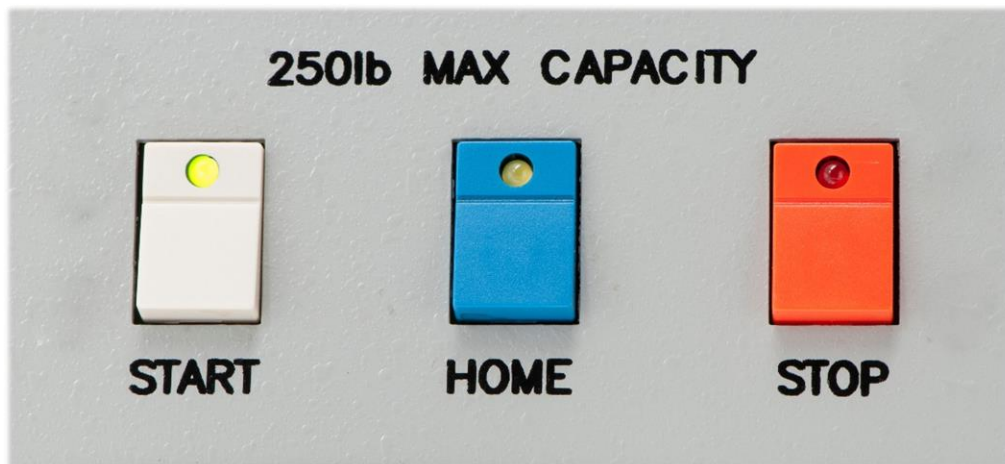
Time remaining will be displayed just below status.

When the force limit is reached, the timer will begin to count down to zero seconds.

During the test, the “Peak force” and “CURRENT FORCE” (and Dial Indicator on the right side of the LCD Display screen) are real-time displayed values during the test.

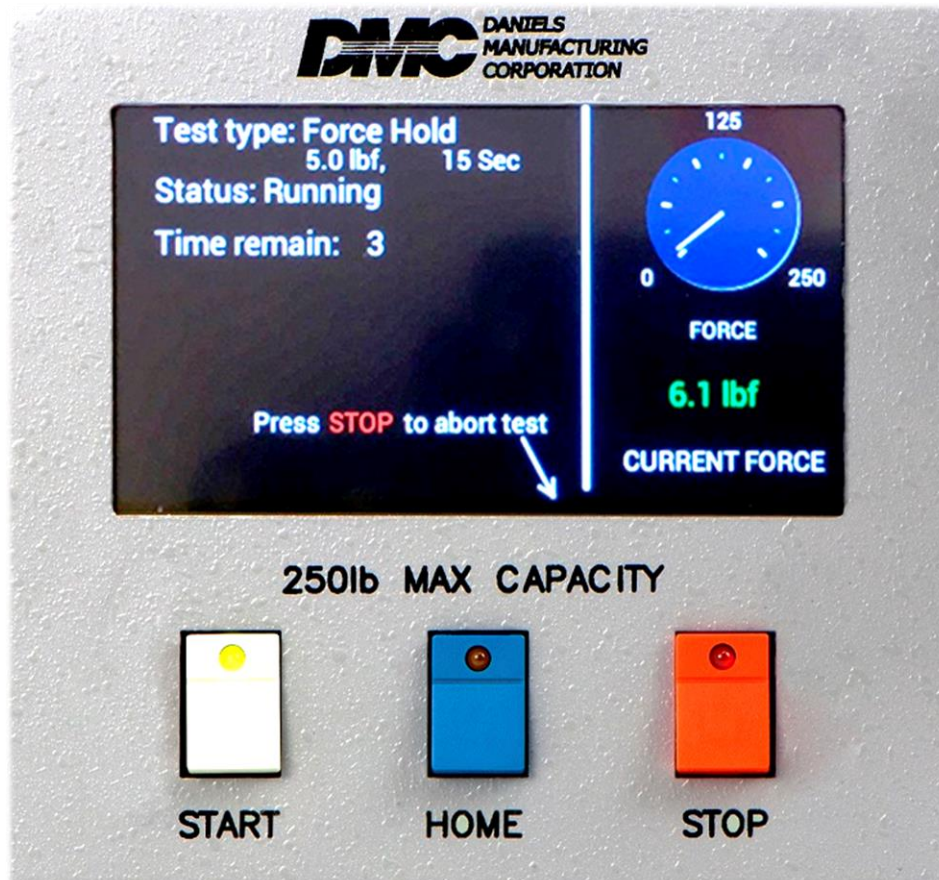
NOTE: *The user can abort a test in progress, by pressing the “STOP” button.*

Press the Physical “START” button to start the test



SAFETY NOTE: *Once START button has been pressed Keep hands / fingers clear of test area! **Eye protection is required.***

Test in progress, Status: "Running"

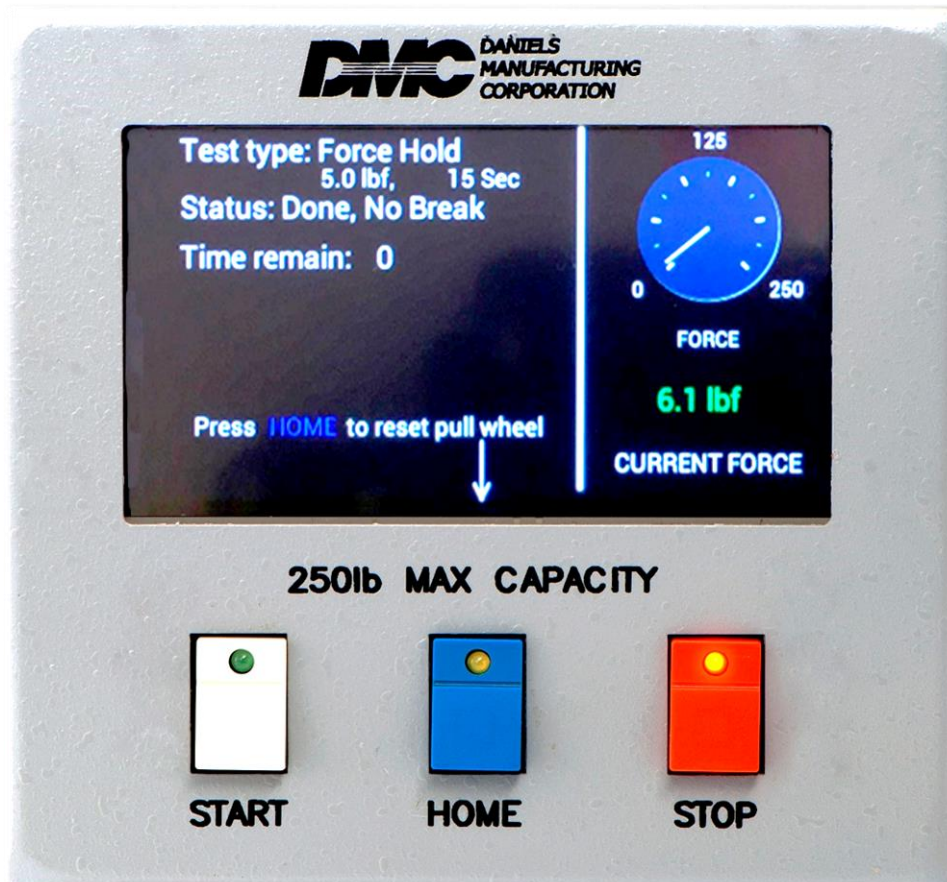


During this test the motor may make multiple adjustments to keep the force as close to the "Force Hold" value as possible (6.1 lbf in this example, with a "Force Hold" set value of 5.0 lbf, see detailed explanation below).

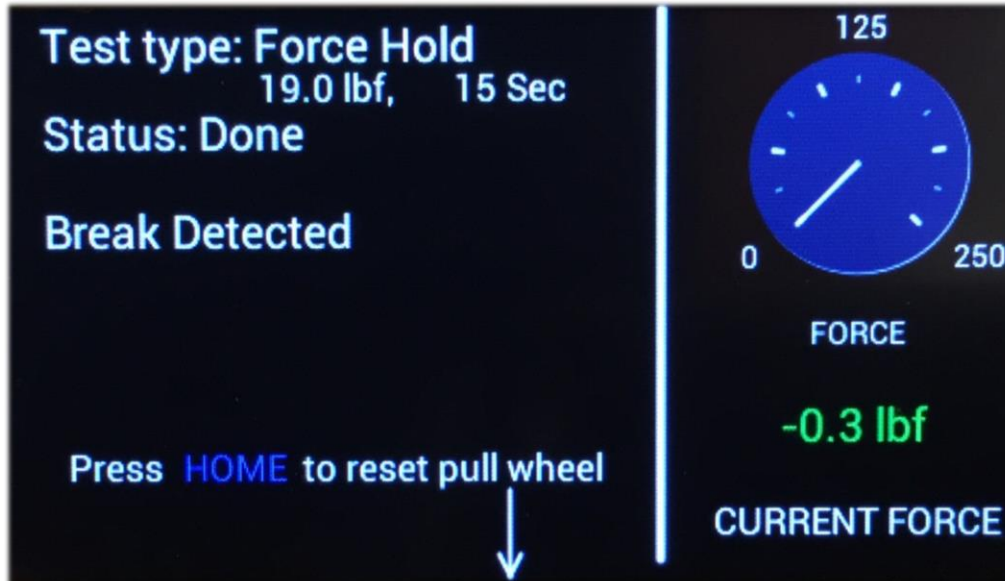
NOTE: *If the force never reaches the expected "Force Hold" value, press "STOP" to abort the test. For safety, if "STOP" is not pushed, the motor will continue to run but only for a limited time (approximately 2 ½ minutes).*

Inspect the contact and wire grips for proper operation.

After the specified time, and if no break / failure has been detected, the unit will display "Status: "Done, No Break", and the "STOP" light will illuminate.



If the MPT-250C detects a break / failure, the unit will display “Status: Done” and “Break Detected” will be displayed.



Record the data from the test.

Next, press “HOME” to prepare the unit for the next test sample.

The motor will rapidly reset to its initial position.

During this time, the “HOME” indicator will illuminate and status will change to “Homing”.

After the motor reaches the home position, remove the contact and wire from the “Contact Grip” and “Wire Grip”.

2.5 Communications Setup

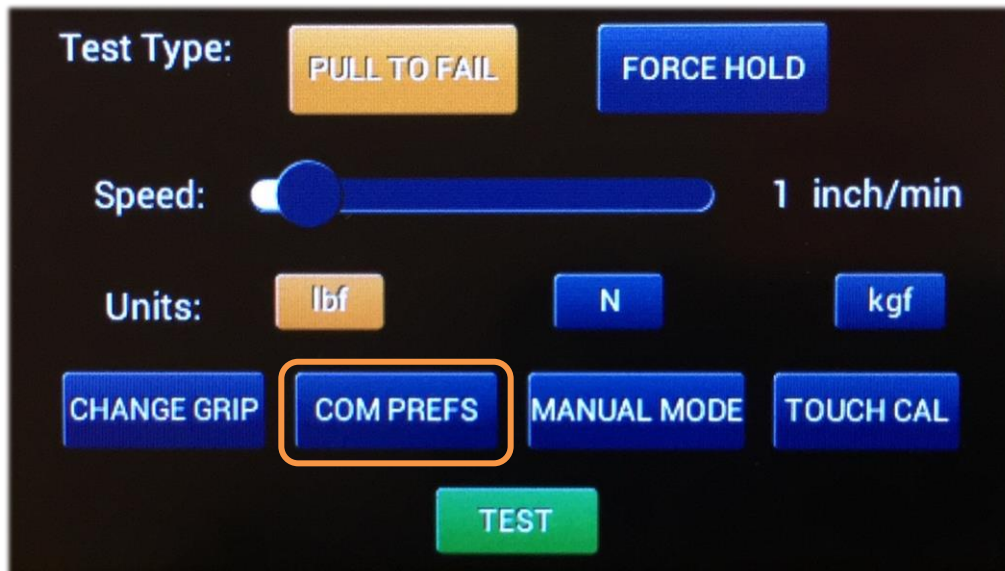
The MPT-250C can communicate to any computer system that has an RS232 serial communications port or a USB 1.1 port or higher. To the host computer system, both of the methods of communication appear as serial ports, one an actual serial port, and the other a virtual port. To the user, both are identical, since the details of different ports are handled by the operating system. Only the USB Virtual Com Port will be used as an example, since both methods of communication are similar to the user. While Mac OS or Linux can be used for communications over USB (with the appropriate drivers) only Windows communications setup will be outlined in this section. Mac OS and/or Linux will be similar.

Using the Communication port, the users can Export Data to a host computer and use that data as needed, such as quality control, crimp contact / tool verification tests, etc.

Setup of the communications parameters sets up both ports. Two output formats are provided to accommodate a wide variety of systems, both new and old.

NOTE: *Only one communication port can be used at a time. It is Not Recommended to connect to both connectors at the same time, unknown results may occur. **For most users the USB port gives the best performance and compatibility.***

To setup the serial port, from the main menu, press the “COM PREFS” button



Choose the port which you intend to use “Serial” or “USB”

NOTE: *The USB driver will automatically setup once the USB port is plugged into the host computer. There should be no need to download and install drivers manually. Windows Device Manager will show the MPT-250C USB driver installed and the assigned virtual serial port number. See Computer System Requirements, section 2.8 for more details*

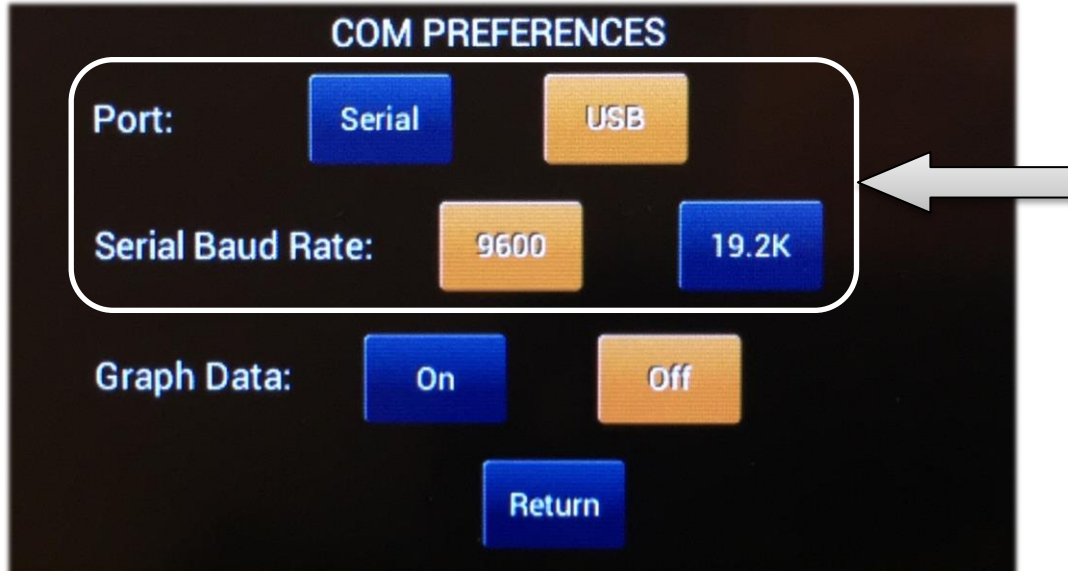
Choose the “Serial Baud Rate”, “9600” and “19.2K” are available data rates. Use the data rate most compatible with your software interface, in most cases this will be “9600” as shown in this example.

NOTE: *The data acquisition rate (approximately 30 samples per second) from the MPT-250C is the same regardless of the Baud Rate selected. Both Baud Rates therefore work similarly and are included for user preference or custom hardware / software compatibility.*

The data is transmitted with a serial format of: **8 Data Bits, No Parity, and 1 Stop Bit**, and so the valid available communications parameters for the MPT-250C are:

9600, 8, N, 1 (9600 Baud, 8 Data Bits, No Parity, and 1 Stop Bit)

19.2K, 8, N, 1 (19200 Baud, 8 Data Bits, No Parity, and 1 Stop Bit)



The screen above is setup as follows:

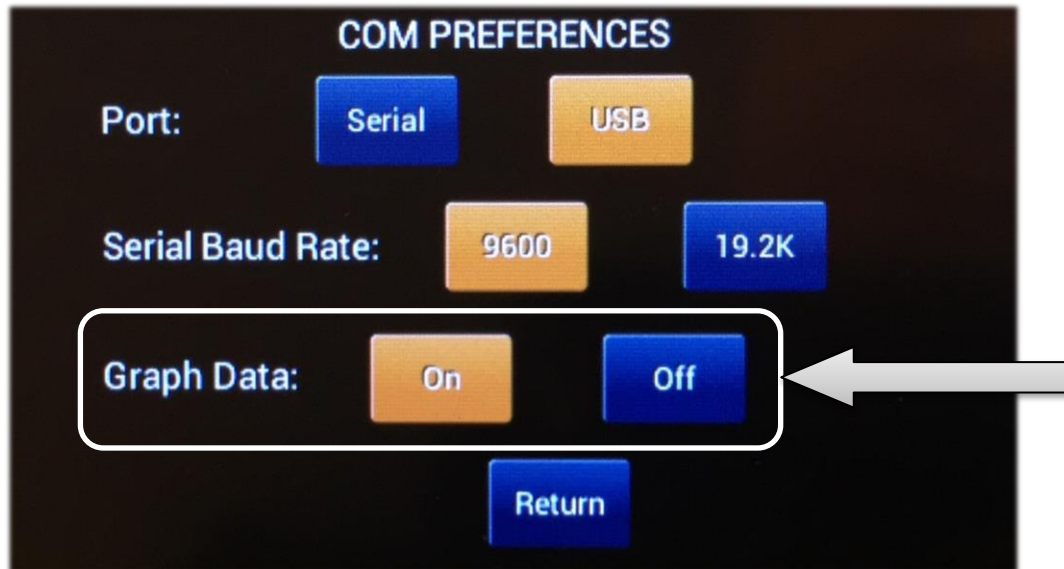
USB (Port)

9600 (Serial Baud Rate) setup as “9600, 8, N, 1”

Off (Graph Data) Explained in next section

2.6 Graph Data / Exporting Data via the Communications Port

To setup the Graph Data output (and Data Export Format), from the main menu, press the “COM PREFS” button



When the user selects Graph Data “Off”, the output format of the data is a simple communication packet from the MPT-250C that contains the basic format test parameters that are on screen.

When the user selects Graph Data “On”, the output format of the data is composed of basic format **plus** continuous reading of force during the test to allow the user to “Graph” the exported data of the actual “Break Detected” / Failure event.

A simple communication program is available from DMC to allow users an easy method of acquiring test data and saving the results for further manipulation as needed. If you have special data logging needs, feel free to contact DMC.

NOTE: *Transmitted Data packet begins with a simple header which allows the user to tell which test is running. The Header Data begins with a <SPACE> and then 2 characters (denoting the type of test & data) and then a <CR><LF>. All Transmitted Data terminates with a <CR><LF>. The <CR><LF> terminator, which stands for “Carriage Return” and “Line Feed”. All of these characters are non-printable characters, and are used to format data, and are themselves not visible (shown in lighter text).*

The actual MPT-250C Data (**in bold**) is transmitted as ASCII character data, such that it is human readable and requires no decoding or other special methods to import the data into popular programs like Microsoft Excel or Notepad, etc.

NOTE: The data shown in the following export examples are representative of the type of data you will receive, however serial numbers, speeds, units, forces or other user input test setup parameters will be different in your exported data.

Here are a few examples of data exported with “**Pull to Fail / Graph Data Off**”

When test is running:

```
<SPACE> <SOH> <ETX> <CR><LF>
DMC MPT-250C SN#00000000<CR><LF>
Pull to fail test<CR><LF>
Pull rate: 1 in/min<CR><LF>
Units: lbf<CR><LF>
```

The "First Line" denotes either graph data off or graph data on mode (for plotting data points), and then the type of test being sent.

When test is aborted:

```
<SPACE> <SOH> <ETX> <CR><LF>
DMC MPT-250C SN#00000000<CR><LF>
Pull to fail test<CR><LF>
Pull rate: 1 in/min<CR><LF>
Units: lbf<CR><LF>
<Test aborted><CR><LF>
```

0d01 / 0h01 (SOH) Graph Data Mode Off
0d02 / 0h02 (STX) Graph Data Mode On
0d03 / 0h03 (ETX) Pull to Fail Mode
0d04 / 0h04 (EOT) Force Hold
0d32 / 0h20 (Space) Space Character
0d10 / 0h0D (CR) Carriage Return
0d0A / 0h0A (LF) Line Feed

When a failure / break is detected:

```
<SPACE> <SOH> <ETX> <CR><LF>
DMC MPT-250C SN#00000000<CR><LF>
Pull to fail test<CR><LF>
Pull rate: 1 in/min<CR><LF>
Units: lbf<CR><LF>
BREAK DETECTED<CR><LF>
Peak force = 15.2 lbf<CR><LF>
```

Pull to Fail / Graph Data Mode Off

Character 1: 0d32 / 0h20 (Space)
Character 2: 0d01 / 0h01 (SOH)
Character 3: 0d03 / 0h03 (ETX)
Character 4: 0d13 / 0h0D (CR)
Character 5: 0d0A / 0h0A (LF)

Here are a few examples of data exported with “**Pull to Fail / Graph Data On**”

When test is running:

```
<SPACE> <STX> <ETX> <CR><LF>
DMC MPT-250C SN#00000000<CR><LF>
Pull to fail test<CR><LF>
Pull rate: 1 in/min<CR><LF>
Units: lbf<CR><LF>
<Begin force data><CR><LF>
0.0, <CR><LF>
0.1, <CR><LF>
0.5, <CR><LF>
1.1, <CR><LF>
.
.
6.0<CR><LF>
```

Pull to Fail / Graph Data Mode On

Character 1: 0d32 / 0h20 (Space)
Character 2: 0d02 / 0h02 (STX)
Character 3: 0d03 / 0h03 (ETX)
Character 4: 0d13 / 0h0D (CR)
Character 5: 0d0A / 0h0A (LF)

**<End force data><CR><LF>
BREAK DETECTED<CR><LF>
Peak force = 27.3 lbf<CR><LF>**

Here is an example with “Force Hold / Graph Data Off”

When a failure / break is detected:

**<SPACE> <SOH> <ETX> <CR><LF>
DMC MPT-250C SN#00000000<CR><LF>
Hold force test<CR><LF>
Hold time: 30 seconds<CR><LF>
Hold Force: 20 lbf<CR><LF>
Units: lbf<CR><LF>
DONE--BREAK DETECTED<CR><LF>
Test FAILED<CR><LF>**

Force Hold / Graph Data Mode Off

Character 1: 0d32 / 0h20 (Space)
Character 2: 0d01 / 0h01 (SOH)
Character 3: 0d04 / 0h04 (EOT)
Character 4: 0d13 / 0h0D (CR)
Character 5: 0d0A / 0h0A (LF)

Here is an example with “Force Hold / Graph Data On”

When a failure / break is detected:

**<SPACE> <SOH> <ETX> <CR><LF>
DMC MPT-250C SN#00000000<CR><LF>
Hold force test<CR><LF>
Hold time: 3 seconds<CR><LF>
Hold Force: 5 lbf<CR><LF>
Units: lbf<CR><LF>
<Begin force data><CR><LF>
5.0, <CR><LF>
5.1, <CR><LF>
5.0, <CR><LF>
5.1, <CR><LF>
. .
5.0, <CR><LF>
<End force data><CR><LF>
DONE--NO BREAK<CR><LF>
Test PASSED<CR><LF>**

Force Hold / Graph Data Mode On

Character 1: 0d32 / 0h20 (Space)
Character 2: 0d02 / 0h02 (STX)
Character 3: 0d04 / 0h04 (EOT)
Character 4: 0d13 / 0h0D (CR)
Character 5: 0d0A / 0h0A (LF)

2.7 DMC Com Terminal – Simple Data Capture Program

The MPT-250C “Simple Data Capture” Program allows quick viewing and saving of acquired data on Windows PCs.

Please see the separate “Software User Manual” (PDF) which accompanies the “DMC Simple Data Capture Program” for simple data acquisition.

The MPT-250C “Simple Data Capture” Program and manual (PDF) are shipped with each MPT-250C on a USB Thumb Drive, along with the MPT-250C Manual (PDF) for quick reference.

Additionally, we ship a USB cable (Type A to A connectors) to attach the MPT-250C to a standard USB port (1.1 or higher) for your convenience.

2.8 Computer System Requirements

USB / RS-232 Host System Requirements

Intel Pentium / Xeon, AMD

Minimum 1GB RAM (plus additional space for data storage)

Microsoft Windows 7/8/10, 32 or 64-bit

Mac OS-X

Linux 3.2 and greater

USB version 1.1 or higher (Type “A to A” connector)

Standard Serial Port (capable of 9600 or 19.2K baud, 8 data bits, 1 stop bit, no parity)

The drivers mentioned are all available to download for free from the FTDI website (www.ftdichip.com). Various 3rd party drivers are also available for other operating systems - see FTDI website (www.ftdichip.com) for details.

For driver installation, please refer to

<http://www.ftdichip.com/Documents/InstallGuides.htm>

DMC Data Communications Terminal Program Requirements

Intel Pentium / Xeon, AMD

Minimum 1GB RAM (plus additional space for data storage)

Microsoft Windows 7/8/10, 32 or 64-bit

NOTE: *The DMC Data Communications Terminal Program is not supported under Mac and Linux at this time, however, any data terminal program that will work with Mac or Linux, can be used to capture data).*

3.0 Errors and Troubleshooting

The MPT-250C has been designed and engineered to the highest standards you expect from DMC. However, we realize there may be instances when troubleshooting will be needed, if and when errors occur.

Possible Common Errors:

Test Timeout – if the test runs longer than 2 ½ minutes without a fail, the system will alert the user.

Solution - While not really an error, it can also be triggered by a sample which slips during testing. If this is the case, make sure the sample is held firmly within the contact clamp **and** the wire clamp.

User abort – if the user presses the physical “STOP” button, the system will alert the user.

Solution - While not really an error, pressing the “STOP” button will terminate the test in progress, before the sample fully fails. For example, graphical data samples may not reflect the entire available data that could be collected to fully show a sample’s tensile strength profile. It is best to allow the MPT-250C to fully complete a test cycle, and use the “STOP” button only if needed for safety issues or if the user wishes to discard that sample test.

Max load – If the system senses a load of over 250lbf (113kgf or 1112.0N), the system will alert the user as well as shut the motor off.

Solution - Please make sure parts tested are done on a rigid work table or sturdy benchtop. Also, the sample should have little or no spring back. Shocks and vibration near the maximum measurable tension can cause intermittent forces that exceed the 250lbf maximum. Part / assembly construction may be such that it can withstand a force greater than 250 lbf.

Internal error – If an internal error has occurred, the system will alert the user.

Solution - This error will require a call to DMC and most likely service at our facility.

Other issues may occur that have not been accounted for or are out of the normal operating parameters of the MPT-250C.

If you have an issue, and cannot find a solution in this manual, please feel free to contact DMC directly at 407-855-6161 or email us at dmc@dmctools.com and we will be happy to help troubleshoot issues regarding this product, its accessories, and their use.

We stand behind our products and want to do everything we can to keep you a happy and satisfied DMC customer!

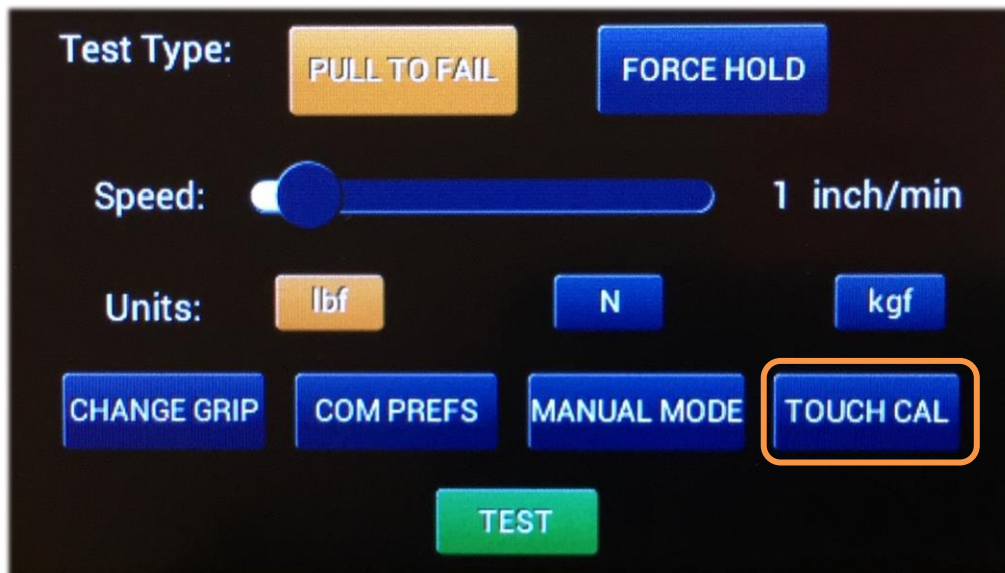
3.1 Touchscreen Calibration

NOTE: *Use only if a problem exists! Do not recalibrate the touchscreen unless you are experiencing problems!*

Use this procedure ONLY if you are experiencing issues when interacting with the LCD Touchscreen, you may recalibrate the user interface alignment to the Touchscreen by using the following procedure.

NOTE: *Be sure to touch the alignment dot exactly in the center. Failure to do so, may render the touchscreen un-usable, and require factory service!*

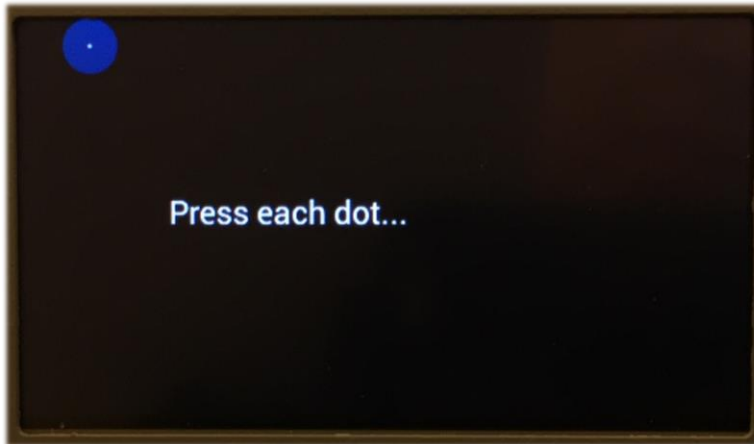
From the main “Menu” on the LCD Touch Screen



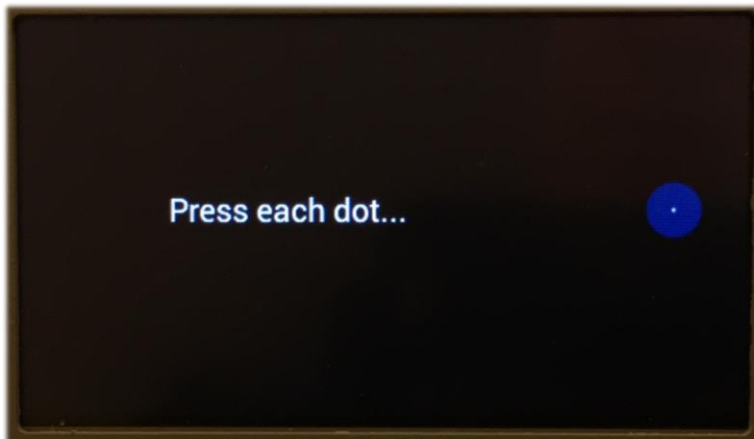
Press “TOUCH CAL” from the main “Menu” on the LCD Touch Screen



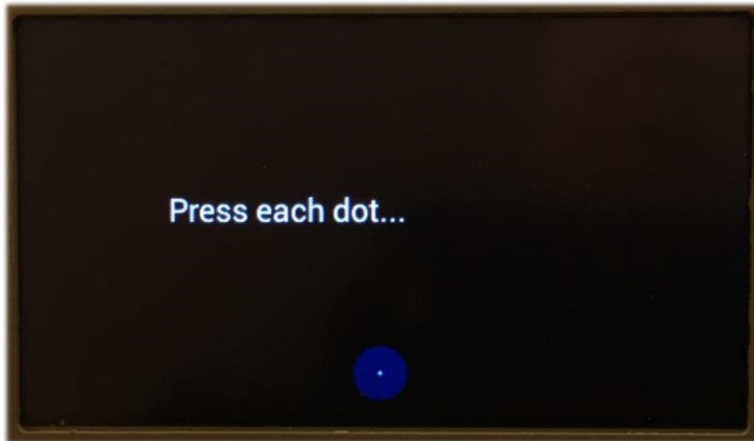
One of 3 alignment screens will appear. Each screen will have a target that the user will “touch”. For each screen the user is instructed to “Press each dot...”



Touch the dot for each position...



And finally the last position...



The internal display controller will then calculate the proper alignment.

After which, the screen will return to the main "Menu" on the LCD Touchscreen.



The LCD Touchscreen will now be in the correct physical positional alignment (calibrated) to the users touch on the virtual screen position, the MPT-250C's LCD "Touchscreen".

NOTE: *Performing this calibration incorrectly may result in the loss of touchscreen functionality.*

IMPORTANT

If you encounter issues not addressed by this user guide or simply have questions, please contact our Customer Service Department (located in Orlando, Florida USA) directly at 407-855-6161, or via email at dmc@dmctools.com, or visit our website for more information at www.dmctools.com today.

“We’re here to help YOU!”

4.0 Specifications

- Force Measurement Range: 2.5 – 250.0 lbf (113kgf or 1112.0N)
- Force Measurement Resolution: 0.1 (lbf, kgf, N)
- Force Measurement Accuracy: +/- 0.5% Full Scale
- Force Readout in Pounds Force, Newtons, Kilograms Force (lbf, N, kgf)
- Safe Force Overload: 150% of Full Scale
- Pull Rate Speeds: 1 to 10 inches per minute (in / min)
- Pull Rate / Speed Accuracy: 1-5 +/- 0.125 in/min, 6-10 +/- 0.250 in/min
- Pull to Fail - Test Force Range: 2.5 – 250 lbf
- Force Hold - Test Force Range: 5 – 100 lbf
- Force hold test force hold accuracy: -2.3 to +2.3 lbs for force < 30 lbs, -4.5 to +3.3 lbs for force >= 30 lbs
- 26 thru 8 AWG, custom grips for larger (or smaller) sizes are available
- Operating Temperature Range: 50°F to 100°F (10°C to 38°C)
- Maximum Storage Temperature: -22°F to 176°F (-30°C to 80°C)
- Humidity Range: 10 – 90%, non-condensing
- Communication Ports: Serial RS-232 (DB9 female connector), USB 2.0 (type A to type A connector)
- Communication Settings: 9600 or 19.2K baud, 8 data bits, 1 stop bit, no parity
- Power Requirements: IEC Connector, 100 – 240VAC, 50/60Hz, 25 Watts maximum (International Power Cords Available)
- External Fuse Type and Rating: Type 3AG (6.3 X 32mm) 1A time delay, 250VAC, >= 35A interrupt capacity.

4.1 Physical

- Weight 23.64 lbs (less options)
- Shipping Weight ≈ 40.6 lbs (with typical / standard grips)
- Case Weight 16.12 lbs
- Base Dimensions: 13.3" Wide x 6" High x 11" Deep

4.2 Calibration

- New units are supplied with a “Certificate of Calibration” traceable to NIST
- Factory Calibration available

NOTE: In order to maintain proper NIST traceability, time between calibrations **Must Not Exceed** 12 Months between Calibrations

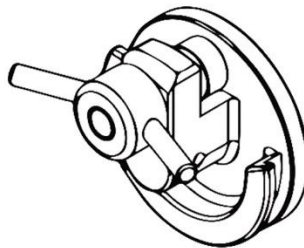
4.3 Standard and Optional Accessories

- Self-Tightening Cam-Type (Contact) Grip (P/N 15-3202C) *
- Heavy-Duty Swivel Lockdown Upper Grip (P/N 15-3046) *
- Ring Terminal Grip (P/N 15-0066C)
- Miniature Contacts Grip (P/N 15-3314)
- Slotted Wheel Grip (P/N 15-3087C)
- Safe-T-Cable Grip Set (P/N 15-3318)
- Calibration Verification Fixture (MPT-VF)
- Customized Grips are available for specific applications

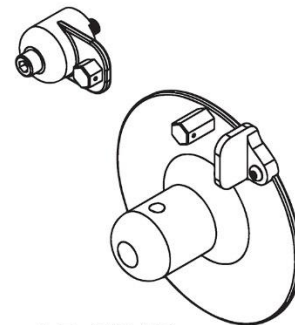
** Standard / Shipped with Unit and Installed*



15-3202C
Cam Grip
 Standard Contact Grip
 Terminal Lugs, Machined Contacts



15-3046
Standard Wire Pull Grip
 Heavy-Duty Swivel
 Lockdown Upper Pull Grip



15-3318
Safe-T-Cable Pull & Grip Set
 Optional Self-aligning hole guides
 for .022, .032, & .040 Safe-T-Cable.



15-0066C
Post Grip
 Optional Contact Grip
 Ring Terminals



15-3087C
Slotted Wheel Grip
 Optional Contact Grip
 Terminal Lugs,
 Machined Contacts



15-3314
Mini-Vise Grip
 Optional Contact Grip
 Miniature Contacts



MPT-VF
**Weight Hanger for
 Verification Only**
 Optional Accessory
 Verification Fixture



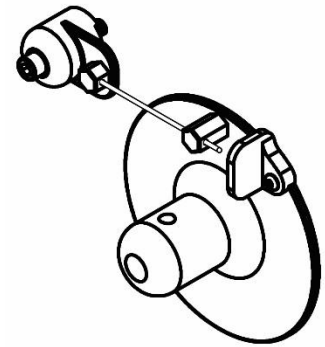
Machined Type Contact

Loaded into
15-3202C Grip



Wire

Loaded into
15-3046 Grip



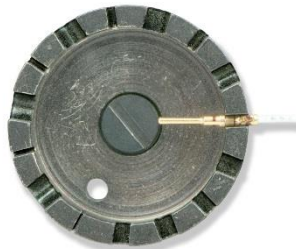
Safe-T-Cable Assembly

Loaded into
15-3318 Grip



Ring Terminal

Loaded onto
15-0066C Grip



Machined Type Contact

Loaded into
15-3087 Grip



Mini Contact

Loaded into
15-3314 Grip







Weight Hanger

Loaded onto
MPT-VF Fixture

4.4 Certificates

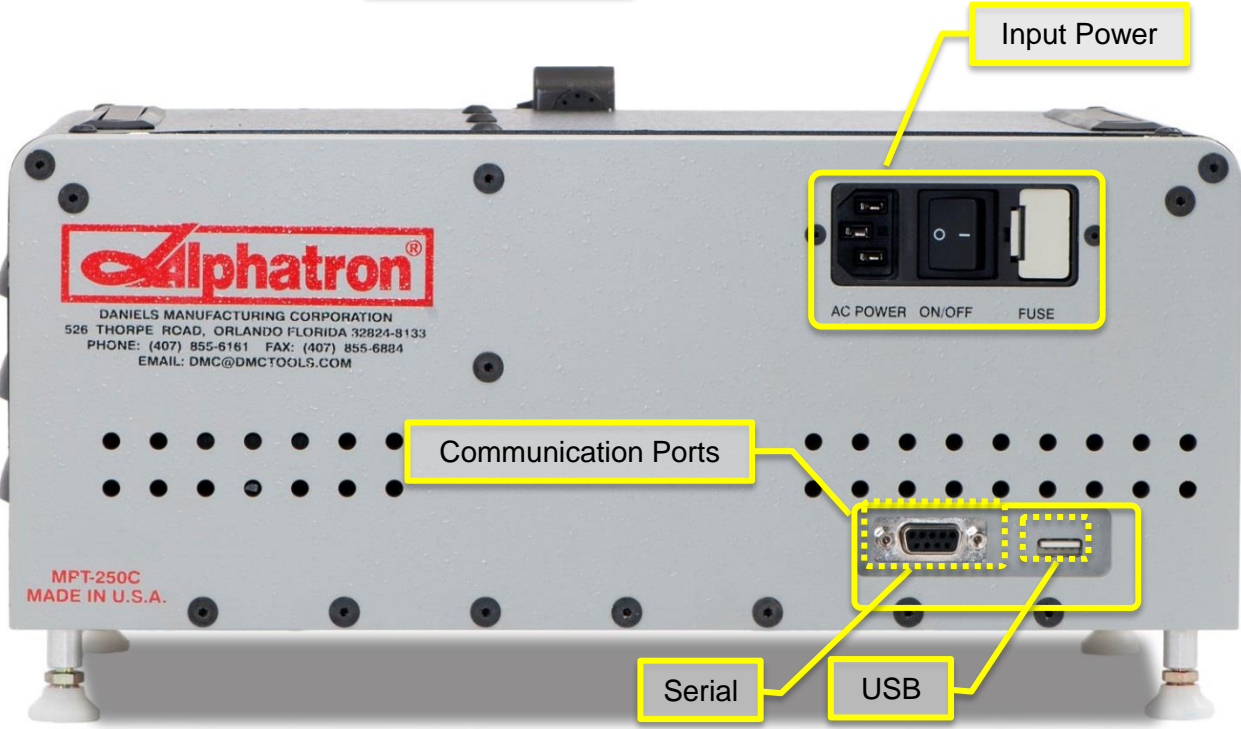
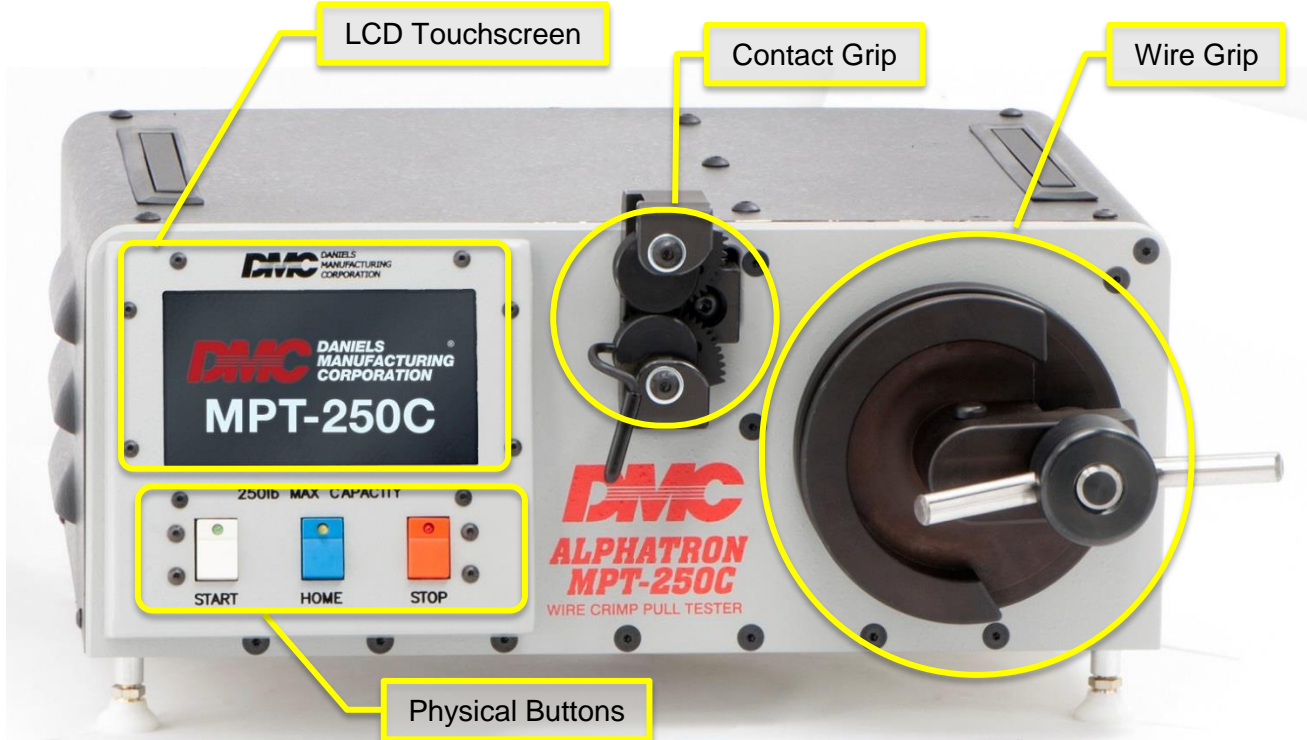
- RoHS Compliant (certificate available upon request or at time of shipment)
- This unit is designed and manufactured to CE requirements. For declaration of conformance, please contact DMC. The following is a representative data plate found on the rear of each tool:

Part # MPT-250C Cage Code: 11851 National Stock No: xxx-xx-xxxx-xxxx Year of Mfg: 2016	 by 
MADE IN USA	
Input Power: 100-250 VAC Single Phase	50/60 Hz
Current: 106 mA @ 250 VAC 171 mA @ 115 VAC	
Interrupt Ratings: Fuse: 500mA 250 VAC Interrupt: 200A 250 VAC	
	

Representative sample only!

5.0 Visual Guide to the MPT-250C

Grips Shown are for Illustrative Purposes Only!



6.0 Reference

Wire Standards Pull Test Values

Minimum Tensile Strength Requirement*				
Conductor Size AWG (Reference)	UL 486A Test Values (Commercial Standard)		Typical MIL-SPEC (AS22520, AS7928, ETC)	
	AWG	Pounds	Newtons	Pounds
26	3	13.4	7	31.2
24	5	22.3	10	44.5
22	8	35.6	15	66.8
20	13	57.9	19	84.6
18	20	89.0	38	169.1
16	30	133.5	50	222.5
14	50	222.5	70	311.5
12	70	311.5	110	489.5
10	80	356.0	150	667.5

*Consult DMC for specific information on tensile strength standards.

7.0 Warranty

LIMITATION OF LIABILITY/LIMITED WARRANTY*

DANIELS MANUFACTURING CORPORATION IS NOT LIABLE FOR CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY NATURE OR KIND RESULTING FROM THE USE OF ANY OF ITS PRODUCTS. OWNERS AND USERS OF DMC PRODUCTS ASSUME FULL RESPONSIBILITY FOR INSTRUCTING THEIR EMPLOYEES IN THE PROPER AND SAFE USE OF SUCH PRODUCTS.

Daniels Manufacturing Corporation warrants each new unit sold by it to be free from defects in material and workmanship under normal use and service. Its obligation under this warranty is limited to the free correction or, at its option, the refund of the purchase price of any such unit which proves defective within 90 days after delivery to the first user, provided that the unit is returned with all transportation charges prepaid, and which shall appear to its satisfaction, upon inspection by it, to have been defective in material or workmanship. This warranty shall not cover any damage to such products, which in the opinion of Daniels Manufacturing Corporation, was caused by normal wear, misuse, improper operation or accident. This warranty is in lieu of all other warranties express or implied. No warranty, express or implied, is made or authorized to be made or assumed with respect to products of Daniels Manufacturing Corporation, other than that herein set forth.

*as defined by PL93-637