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**FLUKE®**

# Fluke 125

Industrial ScopeMeter

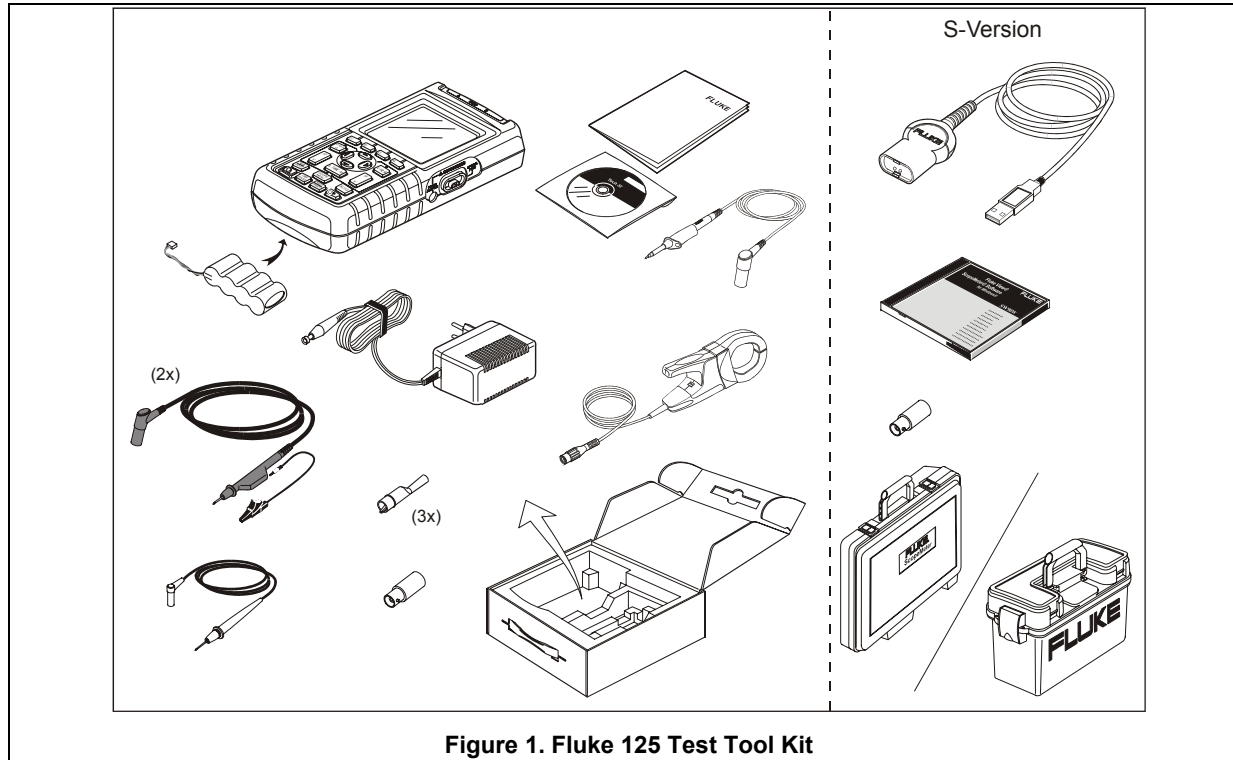
Getting Started 

GB

Dec 2006, Rev. 1, 09/2009

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## Contents of the Fluke 125 Test Tool Kit



# Getting Started

## Introduction

This Getting Started Manual provides basic information on the Fluke 125 ScopeMeter Test Tool. For complete operating instructions, refer to the *Users Manual* on the accompanying CD-ROM

## Contacting a Service Center

To locate a Fluke authorized service center, visit us on the World Wide Web at: [www.fluke.com](http://www.fluke.com) or call Fluke using any of the phone numbers listed below:

+1-888-993-5853 in the U.S.A and Canada  
+31-40-2675200 in Europe  
+1-425-446-5500 from other countries.

## Safety Information: Read First

The Fluke 125 ScopeMeter Test Tool (hereafter referred to as “Test Tool”) complies with:

- ANSI/ISA-82.02.01
- EN/IEC 61010-1: 2001 600 V Measurement Category III, Pollution Degree 2
- CAN/CSA-C22.2 No.61010-1-04 (including cCSA<sub>US</sub> approval)

Use the Test Tool only as specified in the *Users Manual*. Otherwise, the protection provided by the Test Tool might be impaired.

A **Warning** identifies conditions and actions that pose hazard(s) to the user. A **Caution** identifies conditions and actions that may damage the Test Tool.

**⚠ Warning**

To avoid electrical shock or fire:

- Use only the power supply, Model PM8907 (Battery Charger / Power Adapter).
- Before use check that the selected/indicated voltage range on the PM8907 matches the local line power voltage and frequency.
- For the PM8907/808 universal Battery Charger/Power Adapter use only line cords that comply with the local safety regulations.

*Note*

*To accommodate connection to various line power sockets, the PM8907/808 universal Battery Charger / Power Adapter is equipped with a male plug that must be connected to a line cord appropriate for local use. Since the adapter is isolated, the line cord does not need to be equipped with a terminal for connection to protective ground. Since line cords with a protective grounding terminal are more commonly available you might consider using these anyhow.*

*The 230V rating of the PM8907/808 is not for use in North America. A line plug adapter complying with the applicable National Requirements may be provided to alter the blade configurations for a specific country.*

**⚠ Warning**

To avoid electrical shock or fire if a Test Tool input is connected to more than 42 V peak (30 Vrms) or on circuits of more than 4800 VA:

- Use only insulated voltage probes, test leads and adapters supplied with the Test Tool, or indicated as suitable for the Fluke 125 Test Tool.
- Before use, inspect voltage probes, test leads and accessories for mechanical damage and replace when damaged.
- Remove all probes, test leads and accessories that are not in use.
- Always connect the battery charger first to the ac outlet before connecting it to the Test Tool.
- Do not apply input voltages above the rating of the instrument. Use caution when using 1:1 test leads because the probe tip voltage will be directly transmitted to the Test Tool.
- Do not use exposed metal BNC or banana plug connectors.
- Do not insert metal objects into connectors.
- Always use the Test Tool only in the manner specified.

**⚠ Max. Input Voltages**

- Input A and B directly ..... 600 V CAT III
- Input A and B via BB120 ..... 300 V CAT III
- Input A and B via STL120..... 600 V CAT III

**⚠ Max. Floating Voltage**

- From any terminal to ground ..... 600 V CAT III

**Voltage ratings are given as “working voltage”. They should be read as Vac-rms (50-60 Hz) for AC sine wave applications and as Vdc for DC applications.**

Measurement Category III refers to distribution level and fixed installation circuits inside a building.

The isolated input connectors have no exposed metal and are fully insulated to protect against electrical shock.

***If Safety Features are Impaired***

**Use of the Test Tool in a manner not specified may impair the protection provided by the equipment.**

Before use, inspect the test leads for mechanical damage and replace damaged test leads!

Whenever it is likely that safety has been impaired, the Test Tool must be turned off and disconnected from the line power. The matter should then be referred to qualified personnel. Safety is likely to be impaired if, for example, the Test Tool fails to perform the intended measurements or shows visible damage.

***Preparing for Use***

At delivery, the installed rechargeable batteries may be empty. To reach full charge they must be charged for 7 hours with the Test Tool turned off:

- use only the supplied Battery Charger/Power Adapter model PM8907
- before use check that the PM8907 voltage and frequency range match the local line power range
- connect the battery charger to the ac outlet
- connect the battery charger to the POWER ADAPTER input on the right-hand side of the Test Tool.

**Caution**

**To prevent decrease of the battery capacity, you must charge the batteries at least once a year.**

## Powering/Resetting the Test Tool

Turning power on/off:



The Test Tool powers up in its last setup configuration.

Resetting the Test Tool to the factory (default) settings:



Turn power off, then press and hold the Backlight key and turn on again. You should hear a double beep.

## Changing Backlight and Contrast

To save battery power, the screen can be set to an economic brightness display when operated on the battery pack (with no power adapter connected).

*Note*

*Using dimmed display lengthens maximum battery power operation time.*

To change the brightness and contrast:



Open the LIGHT/CONTRAST button bar.



Press LIGHT.



Dim / Brighten the backlight.



Press CONTRAST.



Adjust the Contrast of the display.

## Reading the Screen

The screen is divided into three areas that are indicated in Figure 2. The areas are:

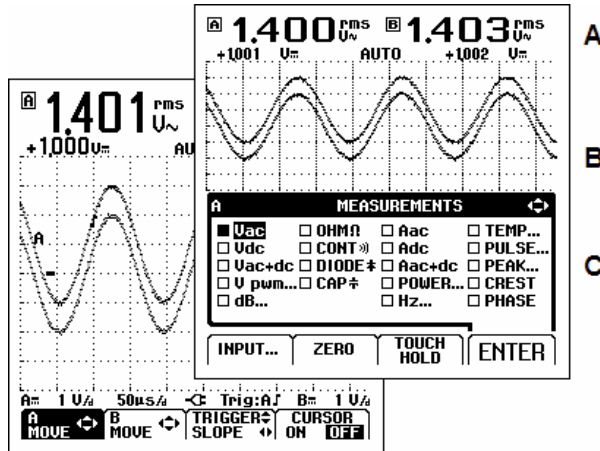
**Reading area (A):** Displays the numeric readings. If only input A is on, you will see the input A readings only. If input B is on you will also see the input B readings.

**Waveform area (B):** Displays the Input A(B) waveform. The trace identifier (A) is visible on the left of the waveform. The zero icon (-) identifies the ground level of the waveform. The bottom line displays the ranges / div and the power indicator (line or battery).

*Note:*

*When battery powered, the battery indicator informs you about the condition of the battery from full to empty:*







**Menu area (C):** Displays the menu that provides choices available through the blue arrow keys and the ENTER key:



**Figure 2. The Screen Area's**

## **Making Menu Selections**

Selection of a function in the menu is done as follows:

-  A menu pops up after operation of, for instance, the MENU key.
-  Use the arrow keys to highlight for example the SCOPE/METER mode.
-  Press ENTER to confirm the selection.
-  The input A measurements menu pops up.
-  Use the arrow keys to highlight the desired measurement function.
-  Press ENTER to confirm the selection.

## Input Connections and Grounding

For **Voltage** measurements use the Shielded Test Leads on Input A (red) and/or Input B (grey).

For **Current** measurements use a current probe on Input A and/or Input B.

For **Power** measurements use a voltage probe on Input A and a current probe on Input B.

For **Temperature** measurements use a 1 mV/°C or 1 mV/°F temperature probe (optional) on Input A and/or Input B.

For **OHM $\Omega$** , **CONTinuity**, **DIODE**, and **CAPacitance** measurements (Meter mode) use the Red Shielded Test Lead at Input A and the Long Black Ground Lead at Input COM (Common).

For **low frequency** measurements and **high signal levels**, use the Black COM (Common) Input as single ground. Figure 3 shows this.

For measurements at **higher frequencies** up to 10 MHz or **low levels**, use both Shielded Test Leads with Short Ground Leads instead of using the COM Input.

For measurements at frequencies above 10 MHz use the VP40 10:1 probe with a short ground lead.

Bear in mind that the Short Ground Leads must be connected to the same potential! Refer to Figure 4.

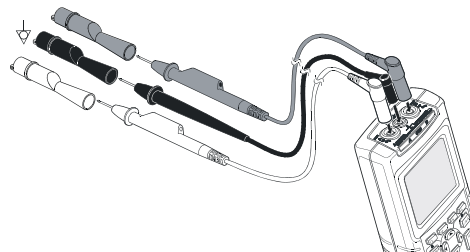


Figure 3. Grounding with Unshielded Ground Lead.

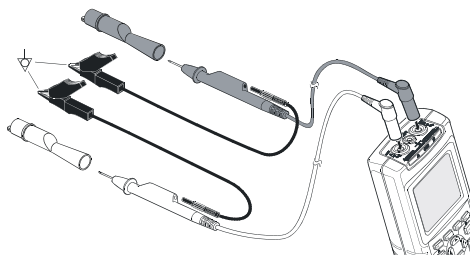


Figure 4. Grounding with Short Ground Leads

### Warning

To avoid electrical shock or fire, use only one COM (common) connection , or ensure that all connections to COM  are at the same potential.



## **Displaying an Unknown Signal with Connect-and-View™ (Auto Set)**

The Connect-and-View™ function enables hands-off operation to display complex unknown signals in SCOPE/METER mode. This function optimizes the position, range, time base, and triggering and assures a stable display on nearly all waveforms. If the signal changes, the setup will track these changes.

To enable the Connect-and-View™ function, do the following:

- Connect the red test lead from red Input A to the unknown signal to be measured



Perform an Auto Set.

Certain details of the waveform can be made visible by manually changing amplitude, time base, waveform position, and triggering. How to do that is explained in the course of this Guide.

## **Freezing the Screen**

You can freeze the screen (Waveforms and Readings) with the HOLD/RUN key. This allows you read the screen while the Test Tool has been disconnected from the Device to be checked.



Freeze the screen. HOLD appears in the bottom of the reading screen.



Start the measurement again.

## **Scope/Meter Measurements**

Make the input connections as described on page 6.

### **Selecting the SCOPE/METER mode**



Open the application mode menu.






Highlight SCOPE/METER



Enter the SCOPE/METER mode.





### Scope Measurements on Input A and B




Choose ac voltage (Vac) measurement for Input A:

	Open the A MEASUREMENTS menu.
	Highlight Vac.
	Press ENTER to confirm the selection.

Observe that Vac (rms V~) is now the Main Reading. The former Main Reading has now moved to the smaller Secondary Reading Position. Figure 5 shows this.

Then choose Peak-to-Peak Reading for Input B:

	Open the B MEASUREMENTS menu.
	Highlight ON.
	Turn INPUT B on.
	Highlight PEAK ...

	Open the PEAK Submenu.
	Highlight PEAK-PEAK.
	Press ENTER to confirm the selection.

Now you will see a screen like in Figure 5. The A and B traces give a graphical representation of the waveforms applied to Input A and Input B.

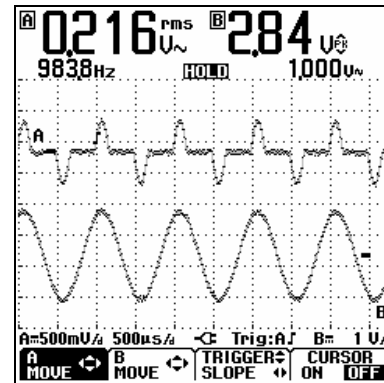


Figure 5. Measurements on Input A and Input B

## Changing the Waveform Representation

Changing the amplitude:



Enlarge or reduce the waveform amplitude; there are separate keys for Input A and Input B.

Changing the Time Base:



Increase or decrease the number of periods.

Positioning the traces:



Select A MOVE or B MOVE.



Position the selected waveform to the desired screen position.

Trigger adjustments:

Triggering tells the Test Tool when to begin displaying the waveform. The trigger point on the waveform is indicated by the Trigger Identifier (⌘). Trigger Level and the Trigger Slope can be adjusted to your personal taste. This may help to get certain signal details within the viewing area:



Enables the arrow keys for Trigger Level and Slope.



Adjust the Trigger Level.



Select Negative / Positive Slope.

## Making Cursor Measurements

Cursors allow you to make precise digital measurements on live and on saved waveforms.



Display the cursor key functions:



Select Cursor measurement type:

- I** Measure signal height at one point of time.
- II** Measure signal height difference between two points of time and measure time difference between these two points.
- ≡** Measure signal height at the cursor positions and between cursor positions.
- I I** Measure rise time or fall time.

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F2

Select the cursor to be moved. Use the blue arrow keys to move the cursors

F3

Depending on cursor measurement type:

TRACE  
A B

Cursor measurements on trace A or B.

AUTO  
MANUAL

Automatic or manual risetime measurement on a single channel.

F4

Switch cursor measurements off.

### Input A and Input B Measurement Menu

VHzA  
Ω ←

- In the Input A and input B measurement menu you can choose from many measurement functions. Selection is done with the arrow keys and activated with F4.

VHzA

- The function keys F1, F2, and F3 give access to submenus:

F1

INPUT ...

- PROBE: SELECT...: for selection of the correct probe type.

- PROBE: AC ADJUST...: for adjustment of 10:1 voltage probes other than the probe supplied with Fluke 125. This is necessary for correct high frequency measurements.
- COUPLING: DC: DC coupled input
- COUPLING: AC: AC coupled input
- WAVEFORM: NORMAL: normal waveform display.
- WAVEFORM: INVERT: inverted waveform display.

F2

ZERO

turns relative measurements on/off. The reading at turning on becomes the zero value, next readings are results compared to the zero value.

F3

TOUCH HOLD

captures and freezes a stable measurement result. A beep indicates this. Press **F4** (TOUCH HOLD OFF) to return to normal measurement mode.

## Trigger Options

MENU

Open the application mode menu.

F1

Open the TRIGGER menu:

INPUT:

- A, B: Triggering on the input A or input B waveform.
- EXT: external triggering via an optically isolated trigger probe.
- VIDEO on A...: triggering on video signals via input A.

UPDATE:

- FREE RUN: gives automatic screen update even if there are no triggers.
- ON TRIG.: only gives screen update when valid triggers occur.
- SINGLE: can be used to catch single events.
- ROLL : is useful for monitoring lower frequency waveforms.

AUTO RANGE :

- >15Hz, >1Hz: selection of Auto Set on signals >15 Hz (fast response) or >1 Hz (slower).

## Waveform/Reading Smooth Options

MENU

Open the application mode menu.

F2

Open the SMOOTH menu:

WAVEFORM:

- ENVELOPE: envelope records all values of live waveforms. On the screen the resultant envelope is displayed.
- NORMAL: the mode most commonly used.
- SMOOTH: is used to suppress noise.




READING A: B:

- FAST: high reading update rate
- NORMAL: the mode most commonly used
- SMOOTH: low reading update rate

## Harmonics Measurements



Use a voltage probe on Input A and a current probe on Input B.

### Selecting the Harmonics mode

	Open the application mode menu.
	Highlight HARMONICS
	Enter the harmonics mode.

If the Input A probe setting is not V (voltage), or the input B probe setting is not (m)V/A (current), a probe menu pops up to enable you to select the required probe.

### Selecting the Probe Type









		Open the PROBE on A or the PROBE on B menu, then select the probe type.
---	---	---

### Harmonics Screen Softkey Functions

The harmonics screen shows a softkey button bar like the one shown below:

The harmonics screen F1...F4 key functions are:








	Show the voltage (VOLT) harmonics, the current (AMP) harmonics, or the power (WATT) harmonics.
	Select %f to display harmonics bars as a percentage of fundamental voltage.  Select %r to display harmonics bars as a percentage of the total of harmonic voltages (V rms).
	 Show the bars screen.   Show the waveform screen.
	Set cursors ON or OFF.  Cursors allow you to make precise digital measurements on the bars screen.  Use the  keys to move the cursor sign  on top of a harmonic bar. The display shows the readings of the marked bar.

## Fieldbus Measurements

Connect the bus to Input A, and depending on the bus type also to input B.






### Selecting the Fieldbus Mode and Bus Type

Choose for example the Modbus, subtype IEA-232/RS-232:

	Open the application mode menu.
	Highlight BUSHEALTH
	Enter the BUSHEALTH mode.
	Highlight Modbus.... The dots ... behind a bus type indicate that a submenu will follow on this selection.
	Open the MODBUS submenu.
	Highlight IEA-232/ RS-232
	Press ENTER to confirm the selection.

## Bus Health Screen





The following icons are used to indicate the bus measurement status:

<b>Activity:</b> ○○○○	bus activity indicators.
1 ○ ○ ○	Bus activity indicator 1: ● (filled) : voltage measured ○ (open) : no voltage measured
2 3 ○ ○ ○	Bus activity indicators 2 and 3: ○ ○ (both open) : no activity * * (blinking) : activity
	Busy, the tester is measuring/processing data.
	No reading available.
	Result OK .
	Warning. Result on edge of limits
	Result not OK.

## Bus Health Screen Softkey Functions







The bus health screen shows a softkey button bar like the one shown below:



	Select the Limit Setup function, see below.
	Select the voltage level reading.
	Select the distortion type reading.
	Display the signal eye-pattern.

## Setting up the Limits

To set up the test limits of the current bus type, do the following:

	Select the SETUP LIMITS... menu from the bus health screen.
	Select the signal property.
	Select the LOW, HIGH, or WARNING level.
	Change the limit. Continue with other limits. Press  DEFAULTS to set all limits to the default value.
	Accept the limits.




To save and recall saved test limit sets see SAVE / PRINT Functions on page 16.







## **Plotting Measurements over Time (Trendplot™)**

The TrendPlot™ function plots a graph derived from the **MAIN** (large) readings in the **SCOPE/METER** mode or in the **HARMONICS** mode as a function of time.

### **Turning the Trendplot Mode On/Off**

	Open the application mode menu.
	Highlight TRENDPLOT
	Start a Trendplot.

### **Trendplot Screen Softkey Functions**

	Stop the Trendplot.
	TREND RESTART: Start a new Trendplot.
	MIN MAX AVERAGE: Secondary (small) reading is the minimum, maximum, or average value since the Trendplot start.
	CURSOR ON OFF: Turn cursor measurements on/off (only possible if screen is frozen). See also Making Cursor Measurements on page 9.

## User Options Menu

USER  
OPTIONS

- USER OPTIONS gives submenus to configure the Test Tool to your personal taste.
- The function keys F1, F2, and F3 give access to submenus:

F1

BATTERY REFRESH.. : should be done about four times a year to keep the batteries in optimal condition.

F2

LANGUAGE: the language of messages can be selected in this submenu.

F3

VERSION & CAL ... shows version and calibration information.

## SAVE / PRINT Functions

SAVE  
PRINT

Show the PRINT SCREEN, RECALL DELETE... and SAVE... key labels.

F2

PRINT SCREEN: The active screen is printed. See User Options Menu to select the printer type and the baud rate.

F3

RECALL DELETE...: opens a menu that enables you to delete to rename or to recall a dataset.

F4

SAVE...: opens a menu that enables you to save a dataset.

A data set consists of the screen capture, the trace, and the test tool setup.