FLUKE®

Fluke 123/124

Industrial ScopeMeter

Getting Started

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Contents of the Fluke 123/124 Test Tool Kit

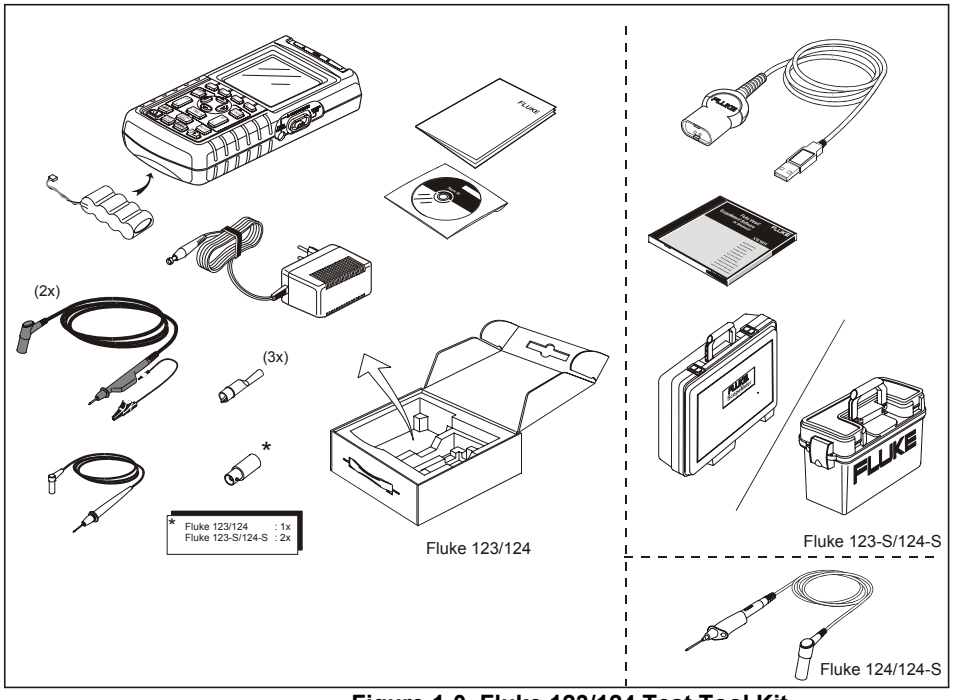

Figure 1-0. Fluke 123/124 Test Tool Kit

Getting Started

Introduction

This Getting Started Manual provides basic information on the Fluke 123 and 124 ScopeMeter Test Tools. 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
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 123/124 ScopeMeter Test Tool (hereafter referred to as “Test Tool”) complies with:

- ANSI/ISA S82.02.01
- EN/IEC 61010-1: 2001 600 V Measurement Category III, Pollution Degree 2
- CAN/CSA-C22.2 No.61010-1-04 (including $_{c}CSA_{us}$ 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 123/124 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 sinewave 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 of the display in Fluke 123, press repeatedly:

	Dim / Brighten the backlight.
	Adjust the Contrast of the display.

To change the brightness and contrast in Fluke 124:

	Switch from cursor to display control.
	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 1. 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 also will 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:

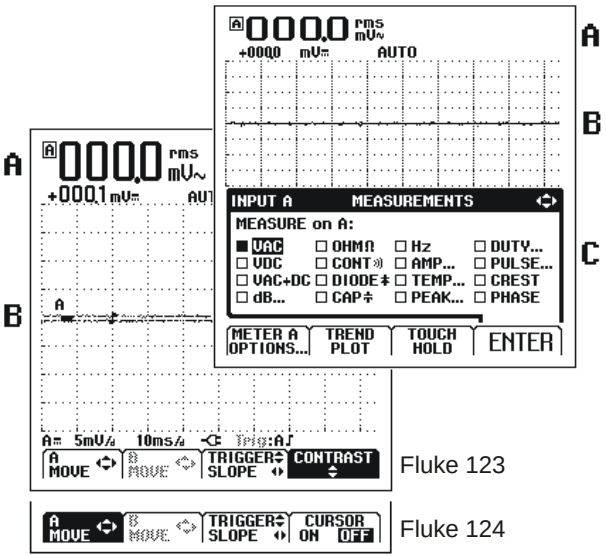

Figure 1. The Screen Area's

Making Menu Selections

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

MENU	A menu pops up after operation of, for instance, the MENU key.
	Use the arrow keys to highlight the desired measurement function.
F4	Press ENTER to confirm the selection.

Meter Measurements

Meter mode is used for OHMΩ, CONTinuity, DIODE, and CAPacitance measurement. Use the Red Shielded Test Lead at Input A and the Long Black Ground Lead at Input COM (Common) in the way as shown in Figure 2.

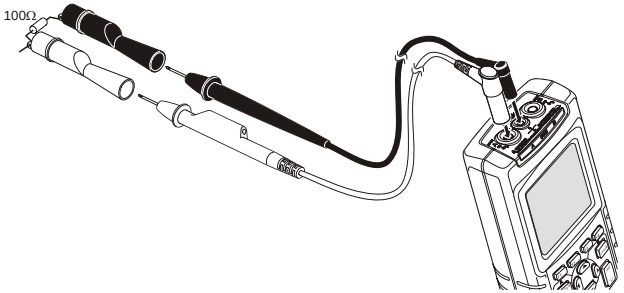

Figure 2. Test lead arrangement for meter measurements

To measure for instance a resistance, proceed as follows:

VHzA Ω⊣⊢	Open the INPUT A Menu.
	Highlight OHMΩ.
F4	Select Ohms measurement. The resistance value is displayed in ohms. Observe that also a bargraph is displayed

Scope Connections and Grounding

For single input measurements use the Red Shielded Test Lead on Input A. For measurements on two different signals, additionally use the Gray Shielded Test Lead on Input B.

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

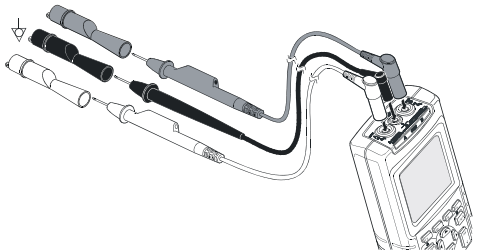

Figure 3. Grounding with Unshielded Ground Lead.

For measurements at higher frequencies or low levels, use both Shielded Test Leads with Short Ground Leads instead of using the COM Input.
Bear in mind that the Short Ground Leads must be connected to the same potential! Refer to Figure 4.

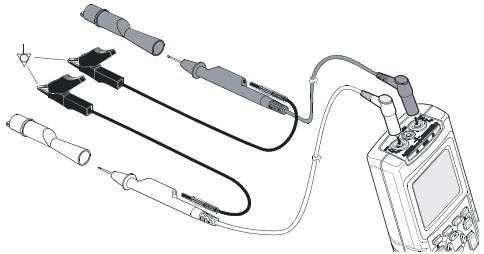

Figure 4. Grounding with Short Ground Leads

⚠ Warning

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

Note:

Fluke 124 is supplied with a 10:1 Oscilloscope Probe. Use of a Probe is recommended when you measure high frequency signals in circuits with a high impedance. The Probe such as supplied matches with the Test Tool without additional high frequency adjustment.
For grounding of the Probe, use a Short Ground Lead such as also used with the Shielded Test Leads.

Displaying a Signal with Connect-and-View™ (Auto Set)

The Connect-and-View™ function enables hands-off operation to display complex unknown signals. 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

AUTO	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.

HOLD RUN	Freeze the screen. HOLD appears in the bottom of the reading screen.
HOLD RUN	Start the measurement again.

Scope Measurements on Input A and B

Choose frequency measurement (Hz) for Input A:

VHzA Ω ⊣⊢	Open the INPUT A Menu.
	Highlight Hz.
F4	Press ENTER to confirm the selection.

Observe that Hz 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:

VHzA	Open the INPUT B Menu.
▲ ▼	Highlight ON.
F4	Turn INPUT B on.
◄ ▲ ► ▼	Highlight PEAK ... . The dots ... behind PEAK indicate that a submenu will follow on this selection.
F4	Open the PEAK Submenu.
▲ ▼	Highlight PEAK-PEAK.
F4	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.

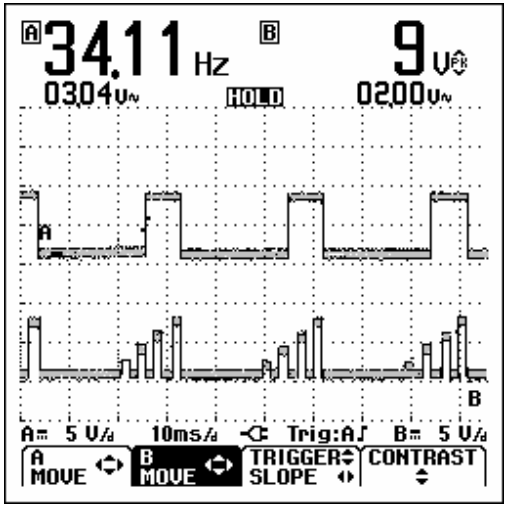

Figure 5. Measurements on Input A and Input B

Manually Changing the Waveform Representation

Changing the amplitude:

mV / V	Enlarge or Reduce the waveform amplitude; there are separate keys for Input A and Input B.

Changing the Time Base:

s TIME / TIME ns	Increase or Decrease the number of periods.

Positioning the traces:

F1 / F2	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:

F3	Enables the arrow keys for Trigger Level and Slope.
	Adjust the Trigger Level.
	Select Negative / Positive Slope.

Making Cursor measurements

Cursors are present in Fluke 124. Cursors allow you to make precise digital measurements on live and on saved waveforms.

F4	Display the cursor key functions: 
F1	Select Cursor measurement type:
	Measure signal height at one point of time.

	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.
	Measure rise time or fall time.
F2	Select the cursor to be moved. Use the blue arrow keys to move the cursors
F3	Depending on cursor measurement type:
	Cursor measurements on trace A or B.
	Automatic or manual risetime measurement on a single channel.
F4	Switch cursor measurements off.

INPUT A Menu / INPUT B Menu

	• In the INPUT A Menu you can choose from many measurement functions. Selection is done with the arrow keys and activated with F4. • The function keys F1, F2, and F3 give access to submenus:
F1	METER A OPTIONS ... : in this menu you can select meter functions like Coupling, Smoothing, and Zero Reference.
F2	TREND PLOT: plots the course of readings as a function of time.
F3	TOUCH HOLD captures and freezes a stable measurement result. A beep indicates this.

	In INPUT B Menu, functions such as in the INPUT A Menu can be selected.

Scope Menu

MENU

- MENU is used to select A and B input signal conditions like coupling, and normal/inverted display.
- The function keys F1, F2, and F3 give access to submenus:

F1

SCOPE OPTIONS ...

SCOPE MODE
- NORMAL: the scope mode commonly used.
- SINGLE SHOT: can be used to catch single events.
- ROLL MODE: is useful for monitoring lower frequency waveforms.

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

F2

PROBES ...
- PROBE on A: for selection of the correct probe type when using non-standard probes.
- PROBE on B. Identical to Input A description.
- PROBE AC ADJUST. For adjustment of 10:1 voltage probes other than the probe supplied with Fluke 124. This is necessary for correct high frequency measurements.

F3

TRIGGER ...
- INPUT: selection of the trigger source on which the Test Tool is triggered. EXTernal triggering is possible via an optically isolated trigger probe.
- SCREEN UPDATE: FREE RUN gives automatic screen update even if there are no triggers. ON TRIG only gives screen update when valid triggers occur.
- AUTO RANGE: selection of Auto Set on signals >15 Hz (fast response) or >1 Hz (slower).

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 information.

SAVE / PRINT menu

SAVE PRINT	• SAVE / PRINT lets you save Screens and Setups to memory, to recall them later • The function keys F1, F2, and F3 give access to submenus:
F1	PRINTER SETUP: selection of printer type and the baud rate.
F2	PRINT SCREEN: The active screen is printed.
F3	DELETE ALL: Deletes all memories at the same time.