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FLUKE®

725

Multifunction Process Calibrator

Users Manual

October, 1998 Rev.3, 5/04

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Multifunction Process Calibrator

Introduction

Your Fluke 725 Multifunction Process Calibrator (referred to as “the calibrator”) is a handheld, battery-operated instrument that measures and sources electrical and physical parameters. See Table 1.

In addition to the functions in Table 1, the calibrator has the following features and functions:

- A split-screen display. The upper display allows you to measure volts, current, and pressure only. The lower display allows you to measure and source volts, current, pressure, resistance temperature detectors, thermocouples, frequency, and ohms.
- Calibrates a transmitter using the split-screen.
- A thermocouple (TC) input/output terminal and internal isothermal block with automatic reference-junction temperature compensation.
- Stores and recalls setups.
- Manual stepping and automatic stepping and ramping.
- Controls the calibrator remotely from a PC running a terminal emulator program.

Contacting Fluke

To order accessories, receive operating assistance, or get the location of the nearest Fluke distributor or Service Center, call:

USA: 1-888-99-FLUKE (1-888-993-5853)
Canada: 1-800-36-FLUKE (1-800-363-5853)
Europe: +31 402-675-200
Japan: +81-3-3434-0181
Singapore: +65-738-5655
Anywhere in the world: +1-425-446-5500

Or, visit Fluke's Web site at **www.fluke.com**.

Table 1. Summary of Source and Measure Functions

Function	Measure	Source
dc V	0 V to 30 V	0 V to 10 V
dc mA	0 to 24 mA	0 to 24 mA
Frequency	1 CPM to 10 kHz	1 CPM to 10 kHz
Resistance	0 Ω to 3200 Ω	15 Ω to 3200 Ω
Thermocouple	Types E, J, K, T, B, R, S, L, U, N, mV	
RTD (Resistance-Temperature Detector)	Pt100 Ω (385) Pt100 Ω (3926) Pt100 Ω (3916) Pt200 Ω (385) Pt500 Ω (385) Pt1000 Ω (385) Ni120	
Pressure	27 modules ranging from 10 in. H_2O to 10,000 psi	27 modules ranging from 10 in. H_2O to 10,000 psi using an external pressure source (hand pump)
Other functions	Loop supply, Step, Ramp, Memory, Dual display	

Standard Equipment

The items listed below and shown in Figure 1 are included with your calibrator. If the calibrator is damaged or something is missing, contact the place of purchase immediately. To order replacement parts or spares, see the user-replaceable parts list in Table 9.

- TL75 test leads (one set)
- AC70A alligator clips (one set)
- Stackable alligator clip test leads (one set)
- *725 Product Overview Manual*
- *725 CD-ROM* (contains Users Manual)
- Spare fuse

Safety Information

The calibrator is designed in accordance with IEC1010-1, ANSI/ISA S82.01-1994 and CAN/CSA C22.2 No. 1010.1-92. Use the calibrator only as specified in this manual, otherwise the protection provided by the calibrator may 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 calibrator or the equipment under test.

International symbols used on the calibrator and in this manual are explained in Table 2.

⚠ Warning

To avoid possible electric shock or personal injury:

- **Do not apply more than the rated voltage, as marked on the calibrator, between the terminals, or between any terminal and earth ground (30 V 24 mA max all terminals).**
- **Before each use, verify the calibrator's operation by measuring a known voltage.**
- **Follow all equipment safety procedures.**
- **Never touch the probe to a voltage source when the test leads are plugged into the current terminals.**
- **Do not use the calibrator if it is damaged. Before you use the calibrator, inspect the case. Look for cracks or missing plastic. Pay particular attention to the insulation surrounding the connectors.**
- **Select the proper function and range for your measurement.**
- **Make sure the battery door is closed and latched before you operate the calibrator.**
- **Remove test leads from the calibrator before you open the battery door.**
- **Inspect the test leads for damaged insulation or exposed metal. Check test leads continuity. Replace damaged test leads before you use the calibrator.**
- **When using the probes, keep your fingers away from the probe contacts. Keep your fingers behind the finger guards on the probes.**
- **Connect the common test lead before you connect the live test lead. When you disconnect test leads, disconnect the live test lead first.**
- **Do not use the calibrator if it operates abnormally. Protection may be impaired. When in doubt, have the calibrator serviced.**
- **Do not operate the calibrator around explosive gas, vapor, or dust.**

⚠ Warning

- **When using a pressure module, make sure the process pressure line is shut off and depressurized before you connect it or disconnect it from the pressure module.**
- **Use only 4 AA batteries, properly installed in the calibrator case, to power the calibrator.**
- **Disconnect test leads before changing to another measure or source function.**
- **When servicing the calibrator, use only specified replacement parts.**
- **To avoid false readings, which could lead to possible electric shock or personal injury, replace the battery as soon as the battery indicator (+▬) appears.**

Caution

To avoid possible damage to calibrator or to equipment under test:

- **Disconnect the power and discharge all high-voltage capacitors before testing resistance or continuity.**
- **Use the proper jacks, function, and range for your measurement or sourcing application.**

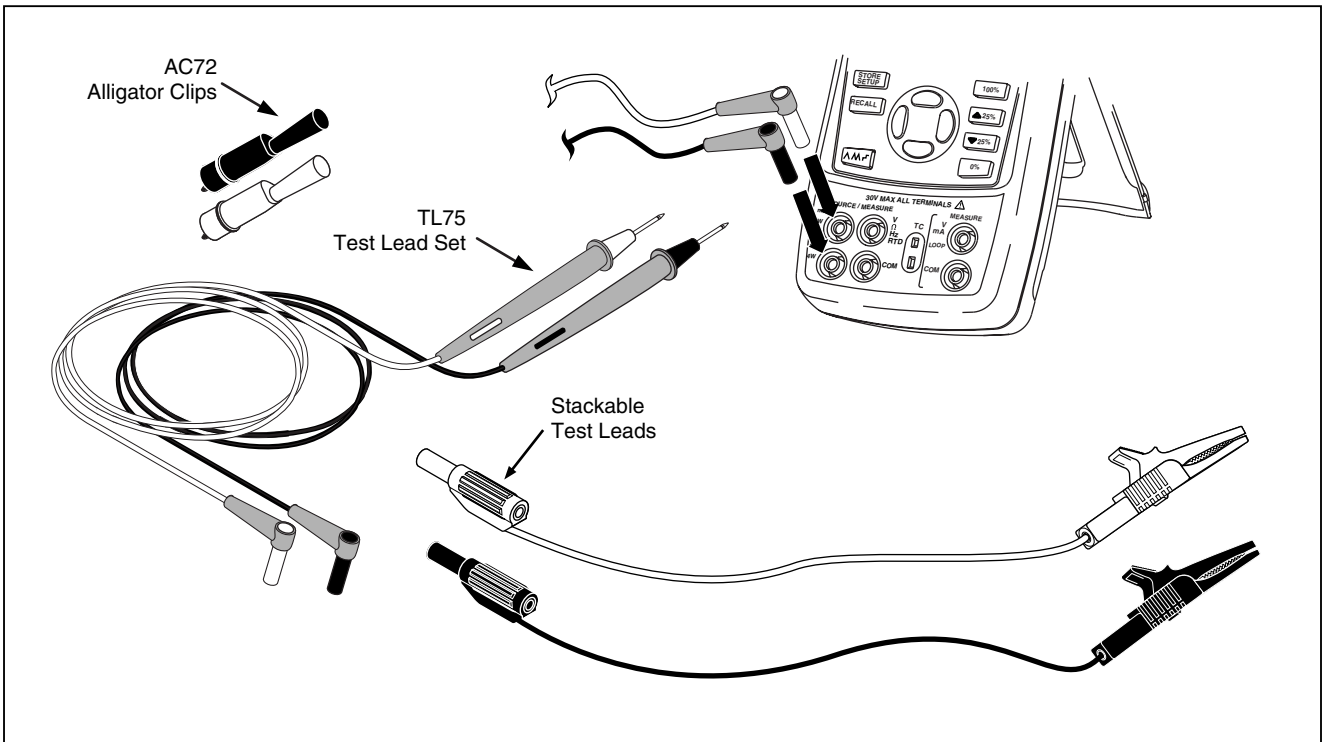

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Figure 1. Standard Equipment

Table 2. International Symbols

~	AC - Alternating current	⧈	Double insulated
⎓	DC - Direct current		Battery
⏚	Earth ground	⚠	Refer to the manual for information about this feature.
	Pressure	⏻	ON/OFF
	Conforms to Canadian Standards Association directives	CE	Conforms to European Union directives

Getting Acquainted with the Calibrator

Input and Output Terminals

Figure 2 shows the calibrator input and output terminals. Table 3 explains their use.

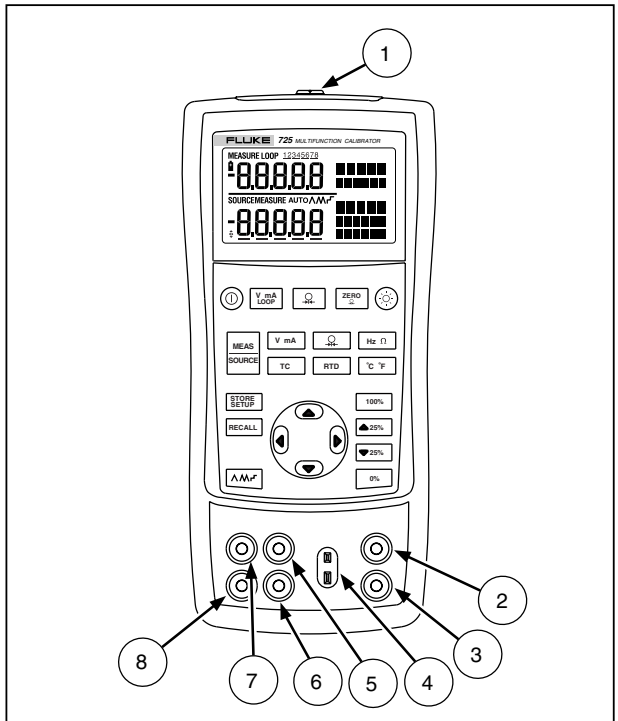

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Figure 2. Input/Output Terminals and Connectors

Table 3. Input/Output Terminals and Connectors

No	Name	Description
①	Pressure module connector	Connects the calibrator to a pressure module or the calibrator to a PC for a remote control connection.
②, ③	MEASURE V, mA terminals	Input terminals for measuring voltage, current, and supplying loop power.
④	TC input/output	Terminal for measuring or simulating thermocouples. This terminal accepts a miniature polarized thermocouple plug with flat, in-line blades spaced 7.9 mm (0.312 in) center to center.
⑤, ⑥	SOURCE/ MEASURE V, RTD, Hz, Ω terminals	Terminals for sourcing or measuring voltage, resistance, frequency, and RTDs.
⑦, ⑧	SOURCE/ MEASURE mA terminals, 3W, 4W	Terminals for sourcing and measuring current, and performing 3W and 4W RTD measurements.

Keys

Figure 3 shows the calibrator keys and Table 4 explains their use.

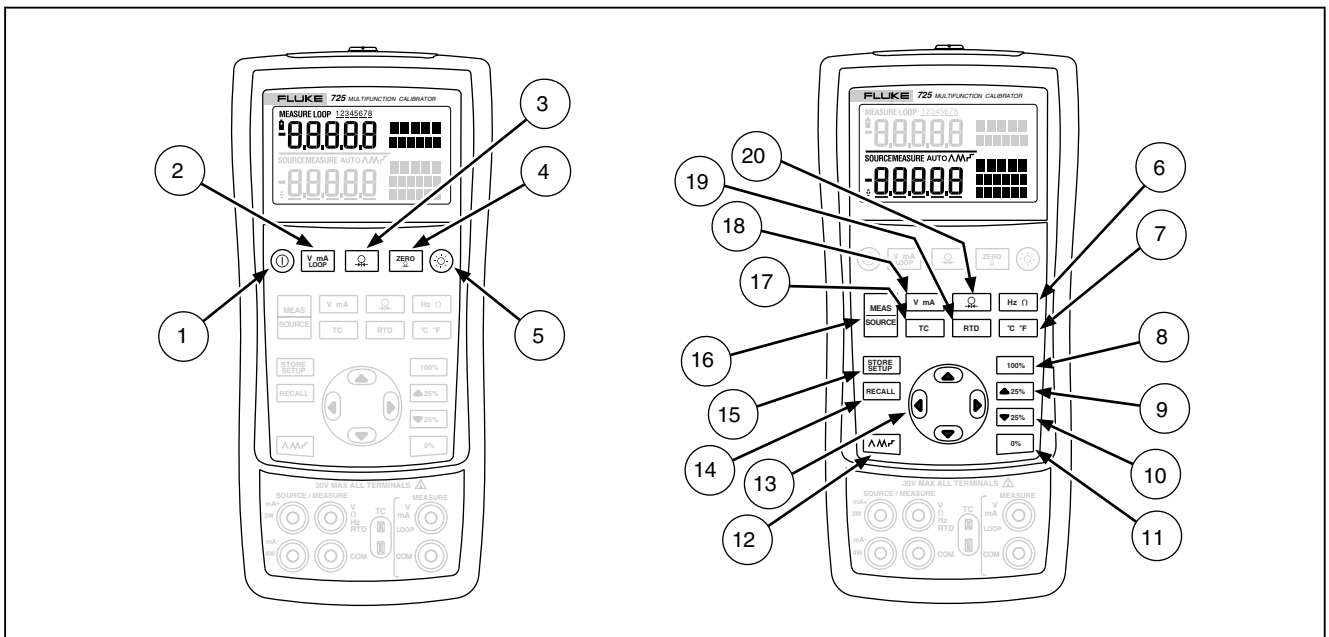

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Figure 3. Keys

Table 4. Key Functions

No	Name	Description
①		Turns the power on or off.
②		Selects voltage, mA or Loop Power measurement function in the upper display.
③		Selects the pressure measurement function in the upper display. Repeated pushes cycle through the different pressure units.
④		Zeros the pressure module reading. This applies to both upper and lower displays.
⑤		Turns backlight on or off. Turns Contrast Adjust mode on when powering up.
⑥		Toggles frequency and ohms measurement and sourcing functions.
⑦		Toggles between Centigrade or Fahrenheit when in TC or RTD functions.
⑧		Recalls from memory a source value corresponding to 100 % of span and sets it as the source value. Press and hold to store the source value as the 100 % value.
⑨		Increments output by 25 % of span.
⑩		Decrements output by 25 % of span.
⑪		Recalls from memory a source value corresponding to 0 % of span and sets it as the source value. Press and hold to store the source value as the 0 % value. Identifies Firmware version. Press and hold when powering up.

Table 4. Key Functions (cont.)

No	Name	Description
⑫		Cycles through : ⋀ Slow repeating 0 % - 100 % - 0 % ramp ⋀⋀ Fast repeating 0 % - 100 % - 0 % ramp ⌐ Repeating 0 % - 100 % - 0 % ramp in 25 % steps
①⑬		Disables Shut Down Mode
①⑬		Enables Shut Down Mode
⑬		Increases or decreases the source level. Cycles through the 2-, 3-, and 4-wire selections. Moves through the memory locations of calibrator setups. In Contrast Adjustment mode; up-darkens contrast, down-lightens contrast.
⑭	RECALL	Retrieves a previous calibrator setup from a memory location.
⑮	STORE SETUP	Saves the calibrator setup. Saves Contrast Adjust setup.
⑯	MEAS / SOURCE	Cycles the calibrator through MEASURE and SOURCE modes in the lower display.
⑰	TC	Selects TC (thermocouple) measurement and sourcing function in the lower display. Repeated pushes cycle through the thermocouple types.
⑱	V mA	Toggles between voltage, mA sourcing, or mA simulate functions in the lower display.
⑲	RTD	Selects RTD (resistance temperature detector) measurement and sourcing function in lower display. Repeated pushes cycle through the RTD types.
⑳		Selects the pressure measurement and sourcing function. Repeated pushes cycle through the different pressure units.

Display

Figure 4 shows the elements of a typical display.

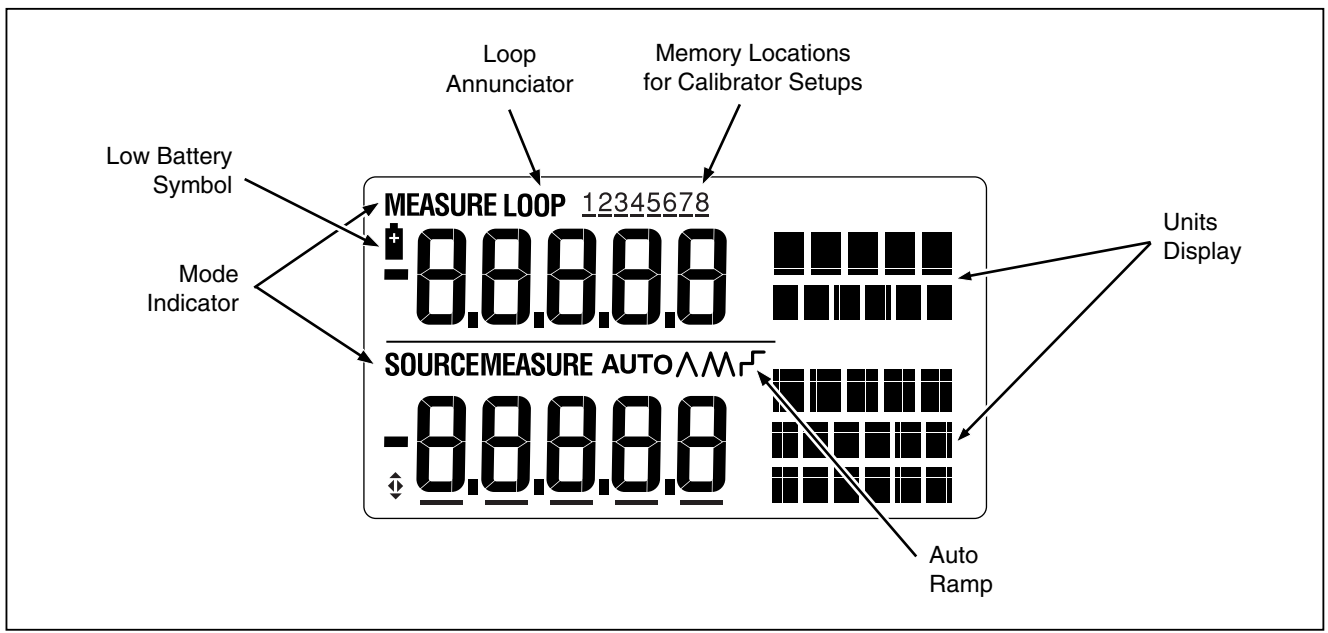

Figure 4. Elements of a Typical Display

Getting Started

This section acquaints you with some basic operations of the calibrator.

Proceed as follows to perform a voltage-to-voltage test:

1. Connect the calibrator's voltage output to its voltage input as shown in Figure 5.
2. Press ⏻ to turn on the calibrator. Press V mA LOOP to select dc voltage (upper display).
3. If necessary, press MEAS SOURCE for SOURCE mode (lower display). The calibrator is still measuring dc voltage, and you can see the active measurements in the upper display.
4. Press V mA to select dc voltage sourcing.
5. Press ◀ and ▶ to select a digit to change. Press ▲ to select 1 V for the output value. Press and hold 0% to enter 1 V as the 0 % value.
6. Press ▲ to increase the output to 5 V. Press and hold 100% to enter 5 V as the 100 % value.
7. Press ▲25% and ▼25% to step between 0 and 100 % in 25 % step increments.

Shut Down Mode

The calibrator comes with the Shut Down mode enabled for a time duration set to 30 minutes (displayed for about 1 second when the calibrator is initially turned on). When the Shut Down mode is enabled, the calibrator will automatically shut down after the time duration has elapsed from the time the last key was pressed. To disable the Shut Down mode, press ⏻ and ◀ simultaneously. To enable the mode, press ⏻ and ▶ simultaneously. To adjust the time duration, press ⏻ and ▶ simultaneously, then press ▲ and/or ▼ to adjust the time between 1 and 30 minutes.

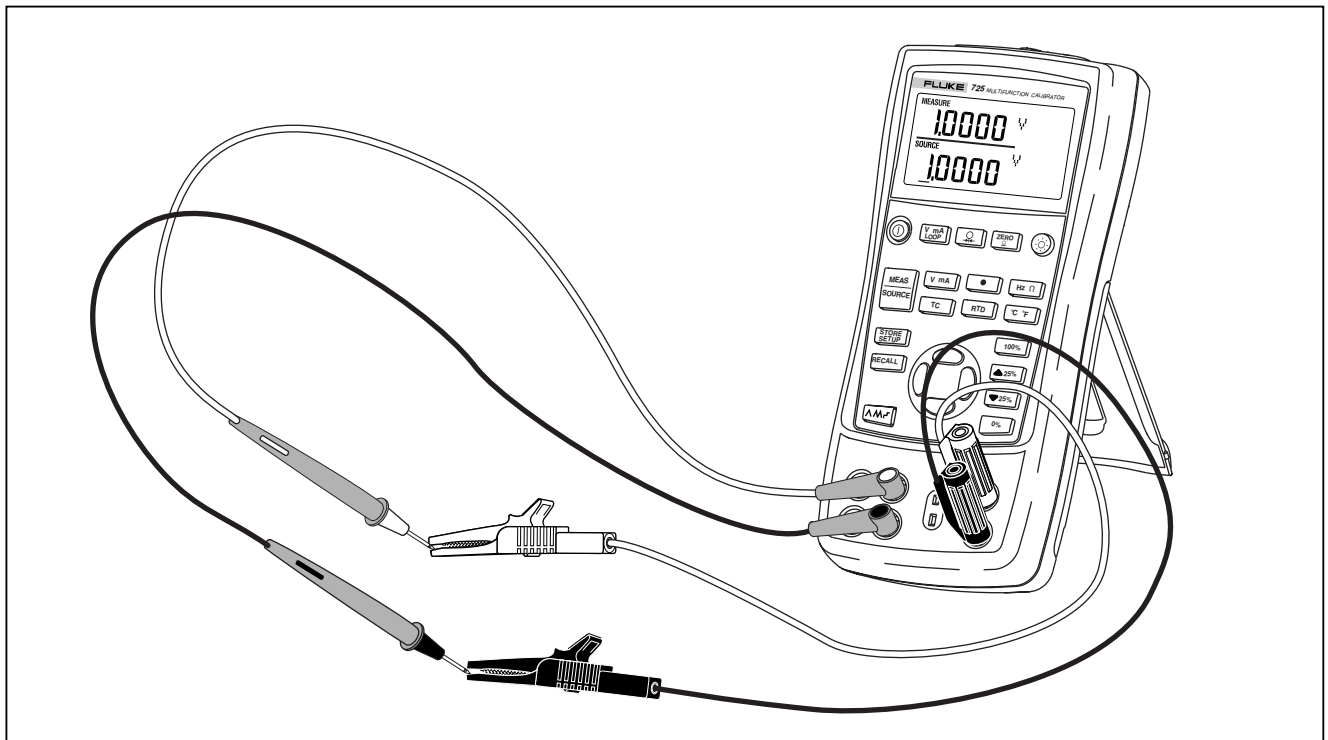

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Figure 5. Voltage-to-Voltage Test