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Fluke 740 Series
Documenting Process Calibrators:
Ready For Anything

Fluke 740 Series Documenting Process Calibrators: Work Smarter. Work Faster.

Whether you're calibrating instruments, troubleshooting a problem or running routine maintenance, Fluke 740 Series process calibrators can help you get the job done faster. It does so many different tasks, so quickly and so well, it's the only process calibrator you need to carry.

- **Multifunctional.** Calibrate temperature, pressure, voltage, current, resistance, and frequency. Since it both measures and sources, you can troubleshoot and calibrate all with one rugged tool.
- **Powerful, yet easy to use.** The easy-to-follow, menu-driven display guides you through any task. Programmable calibration routines enable you to create and run automated as-found/as-left procedures to ensure fast, consistent, calibrations.
- **Records and documents results.** To support your ISO-9000 or regulatory standards, the Fluke 741B, 743B, and 744 capture your calibration results, eliminating the need to juggle a pen and pad in the field. The RS-232 interface in the Fluke 743B and 744 lets you transfer the results to a PC, thus saving the time of having to manually transcribe them when you return to the shop.
- **Supports popular instrumentation management software.** The 743B and 744 work with the new Fluke DPC/TRACK™ software, and with popular programs from Honeywell Loveland, Cornerstone, Sand Cove, Beamex, Blue Mountain, and others. It allows you to create procedures, instructions, and action lists to deliver fast, easy documentation.
- **Truly hand-held.** Small enough to fit easily into a tool bag and to use in tight spaces. Runs an entire shift on a rechargeable NiCd or NiMH battery pack.
- **Rugged and reliable.** Overmolded urethane case stands up to rough handling in industrial environments. Calibrators offer one- or two-year calibration cycles and three-year warranty.
- **Bright white display** lets you read your results in any kind of light.
- **Soft keys** provide one-touch access to enhanced functions such as task lists, automated procedures, scaling, min/max, stepping and ramping, and review memory.
- **Three operating modes** Measure, Source, or simultaneous Measure/Source, — enable technicians to troubleshoot, calibrate, or maintain instrumentation with just one tool.
- **Integrated HART communication capability** lets you program and control HART instrumentation (744 only).
- **Multi-lingual interface** displays instructions in English, French, German, Spanish, and Italian.
- **AutoStep** allows technicians to set the calibrator for a delayed start and a specific sequence of steps, so it can run unattended as a continuously varying test source.
- **User entered values** enable users to capture readings measured or sourced by other devices.
- **Custom units** allow readings to be scaled and displayed in any user-defined units.
- **Limit switch calibration procedures** perform fast, automated calibration of one- and two-point limit switches for voltage, current, temperature, and pressure.
- **Differential pressure flow instrument calibration** routines use a square root function to directly calibrate DP flow instruments.
- **Built-in algebraic calculator** with four functions—plus square root—stores, recalls, and performs calculations required for setting up instruments or evaluating data in the field. Use it to set the source function to a calculated value. There's no need to carry a pencil and paper or a separate calculator.
- **Programmable measurement delay** inside automated procedures permits calibrating instruments that respond slowly.

Two bonus features available with product registration:

- **Transmitter mode**
- **Bar code entry (except 741B)**

FLUKE
744 DOCUMENTING PROCESS CALIBRATOR
06/26/98 12:26:24 pm
MEASURE
Error
0.31 %
Loop 24V
12.050 mA
SOURCE
TC Type K
100.0 °C
Int. Ref.
26.0°C
ITS-90
3.055mV
As Found
Step
Save
More Choices
MEAS SOURCE
mA
SETUP
TC RTD
CLEAR (ZERO)
HART
ENTER
30V MAX
300V MAX
CAT II
MEAS

Fluke 740 Series Documenting Process Calibrators: Calibrators as versatile as you are.

The Fluke 740 Calibrators, offered in three models, let you choose the right set of capabilities for your needs.

- The **Fluke 741B** offers simultaneous source and measure capabilities for all common process parameters. Create and execute automated procedures and automatically capture the results.
- The **Fluke 743B** offers all the capability of the 741B, plus adds a serial interface for two-way communication with popular PC-based instrumentation management applications.
- The **Fluke 744** offers all of the capabilities of the 743B, plus the ability to maintain and calibrate selected HART transmitters without a second tool.

Capability	741B	743B	744
Source / Measure	•	•	•
Automated procedures	•	•	•
Results capture	•	•	•
Uses all Fluke pressure modules	•	•	•
Transmitter mode	•	•	•
Bar code entry		•	•
Serial interface		•	•
Data logging		•	•
HART communications			•
Pulsed RTD simulation to 1 ms	•	•	•
NiMH battery with "Gas Gauge"			•

Fluke 744 HART Documenting Process Calibrator: Get HART-ability.

As more and more process plants begin to take advantage of smart transmitters, the need for a new generation of calibrators has emerged—calibrators that can communicate via industry standard digital protocols. The 744 combines HART communication capability with the popular 740 Series Documenting Process Calibrators to deliver an integrated communicating calibrator. This rugged, reliable tool is ideal for calibrating, maintaining, and troubleshooting HART instrumentation. The 744 offers:

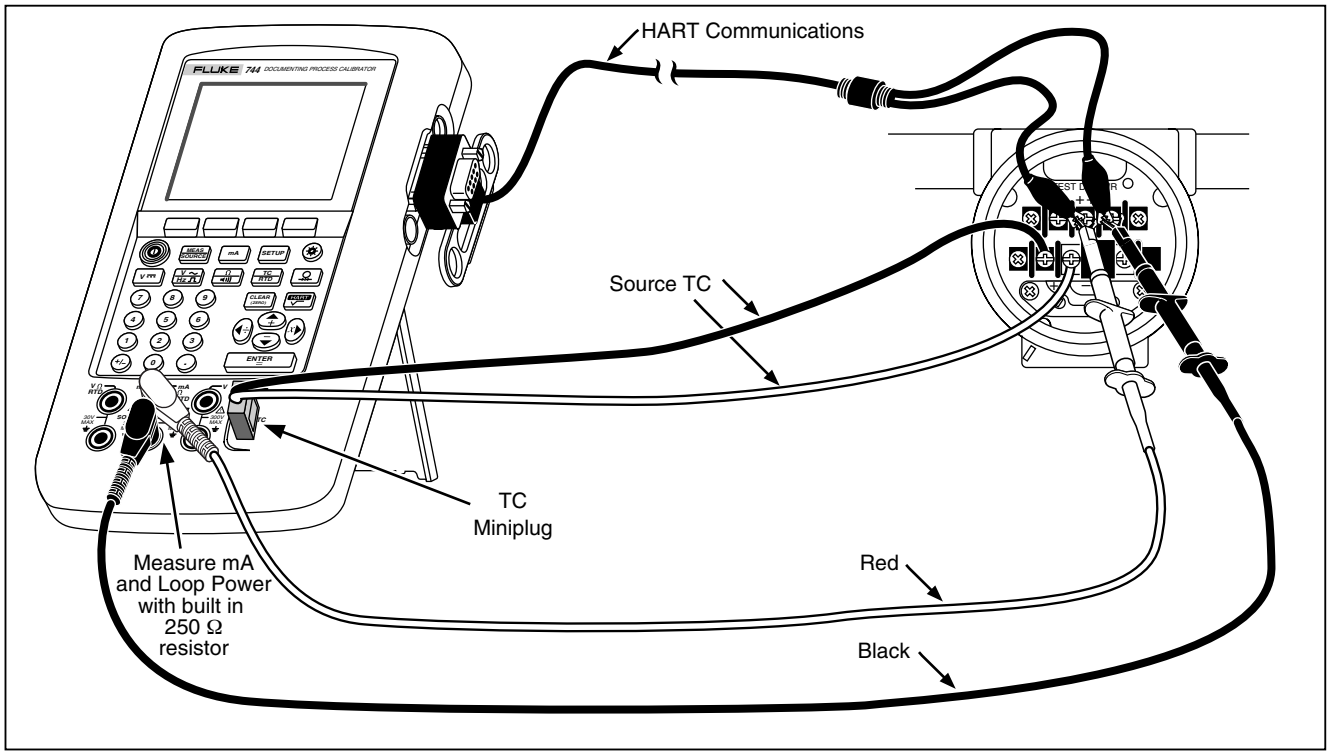
- Integrated HART communication functions, permitting you to monitor, control, and calibrate HART instrumentation.
- Handling of fast pulsed RTD transmitters and PLCs, with pulses as short as 1 mS.
- NiMH battery with 3500 mA hour life and gas gauge.

The first field calibrator for HART instruments that's both powerful and easy to use.
The 744 offers the most complete HART implementation of any process calibrator. The 744:

- Requires no external box or second tool for everyday HART calibration and maintenance.
- Offers fast HART communication.
- Supports popular models of HART transmitters, with more device-specific command support than any other HART field calibrator.
- Fully complies with the Data Link Layer of the HART protocol, including multiple masters, burst mode, and multi-drop configurations.
- Is easy to update as additional instruments are added and new HART versions are released.
- Is based on the 743B, the most rugged, reliable multifunction field calibrator available.
- Is backed by the service and support of the Fluke organization, a member of the HART Communications Foundation.

The 744 is designed to take on nearly all the day-to-day tasks you now perform with a separate communicator. In fact, it offers the communication capabilities of the 275 HART communicator except for the DD interpreter, which can read command set libraries from any HART supplier. This is not necessary for daily HART maintenance.

It's easy to calibrate and maintain HART instrumentation with one powerful tool.

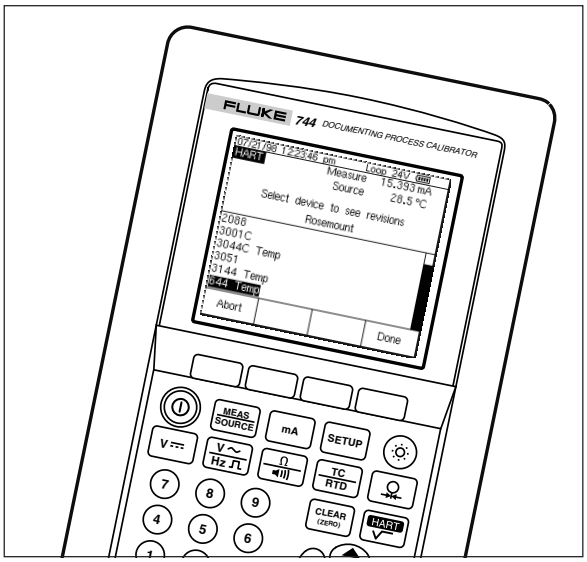


With the 744 DPC, you can:

- Generate precision electrical, temperature, or pressure signals for **analog stimulus** or sensor simulation.
- Simultaneously **measure** electrical, temperature, or pressure signals from **transmitter output**.
- Determine type, manufacturer, model, tag ID by interrogating HART devices.
- **Read HART PV** function and smart transmitter **digital output** while measuring **analog mA output**.
- **Read and write HART configuration functions** to make field adjustments to PV range points, damping, and other top-level configuration settings.
- **Change sensor configuration** on supported temperature transmitters.
- **Re-label smart transmitters** by reading and writing HART tag and message fields.
- **Clone additional transmitters** by reading and storing basic HART configurations.
- Perform **automated HART sensor trim** and output trim for selected devices in conjunction with As Found/As Left tests.
- Perform **loop test** with simultaneous analog and digital mA readout.
- Address new, fast, pulsed-excitation smart transmitters and PLCs.

HART Applications

Fluke 744: The first HART calibrator that is easy to use.



Today's 744 supports device-specific instructions for a variety of popular instruments. Additional support may be added periodically with a simple software update available on diskette or via download for a modest upgrade fee.

HART operating modes supported

- For **Point to Point operation**, the most commonly used mode, connects the 744 to a single HART device in a 4–20 mA loop.
- In **Multi-Drop** mode, several HART instruments can be bussed together. The 744 searches for each, identifies addresses in use, and allows you to select the instrument for calibration and related operations.
- In **Burst Mode**, the HART instrument transmits bursts of data without waiting to be interrogated by a master unit. The 744 can take transmitters out of burst mode during test or calibration, then later restore them to burst mode.

Versatile HART protocol support

The 744 supports the commands contained in HART protocol version 5.7. With 2 MB of memory, the 744 supports a substantial set of HART instructions:

- **Universal commands —** provide functions that are implemented in **all field devices**, for example, read manufacturer and device type, read primary variable (PV), or read current output and percent of span
- **Common practice commands —** provide functions that are common to **many but not all field devices**, for example read multiple variables, set damping time, or perform loop test
- **Device-specific commands —** provide functions that are **unique to a particular field device**, for example sensor trim. The 744 supports these devices:

Manufacturer	Pressure Instruments	Temperature Instruments
ABB/Kent-Taylor	600T	658T[1]
ABB/ Hartmann & Braun	Contrans P,[1] AS 800 Series	
Endress & Hauser	CERABAR M CERABAR S DELTABAR S	
Foxboro Eckardt		TI/RTT20[1]
Foxboro	IAP/IDP/IGP	
Honeywell	ST3000	
Moore Products		344[1]
Rosemount	1151 2088 3001C 3051	3044C 644 3144
Siemens	SITRANS P DS SITRANS P ES	
SMAR	LD301	TT301[1]
Yokogawa	EJA	YTA 110 and 310

[1]Sensor Trim not supported

What's new in Version 2.1

- **Device-specific calibration support for the latest revisions of the following:**
  Endress & Hauser Cerabar S Rev 5
  Endress & Hauser Deltabar S Rev 5
  Rosemount 644 Rev 5
  Yokogawa YTA Rev 2
- **Device-specific calibration support for new instruments:**
  Endress & Hauser Cerabar M Rev 1
- **New measure/source units:**
  Temperature: Kelvin
  Temperature: degrees Rankine
  Pressure: Water Column @ 20C
- **New features:**
  Selectable unit in square root test error summary
  User-enterable calibration adjustment points

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Why use "smart" instrumentation?
Like most process plants, your organization is probably facing the dual challenges of maximizing productivity while minimizing maintenance costs. "Smart" digital transmitters offer superior performance and reliability, while saving time and effort in maintenance and calibration. Manufacturers of field instruments have helped accelerate the changeover by offering smart transmitters at prices nearly as low as analog units. As digital instruments using the HART protocol quickly become the standard, communicators and calibrators are becoming essential everyday tools.

What is HART?
HART, the **H**ighway **A**ddressable **R**emote **T**ransducer protocol, uses a 1200 baud Frequency Shift Keying (FSK) signal to superimpose digital information on the conventional 4–20 mA analog signal.

Why use the HART protocol?

HART is an industry standard developed to define the communications protocol between intelligent field devices and a control system, HART is the most widely used digital communication protocol in the process industry. More than five million HART field instruments are installed in more than 100,000 plants worldwide.

The HART protocol:

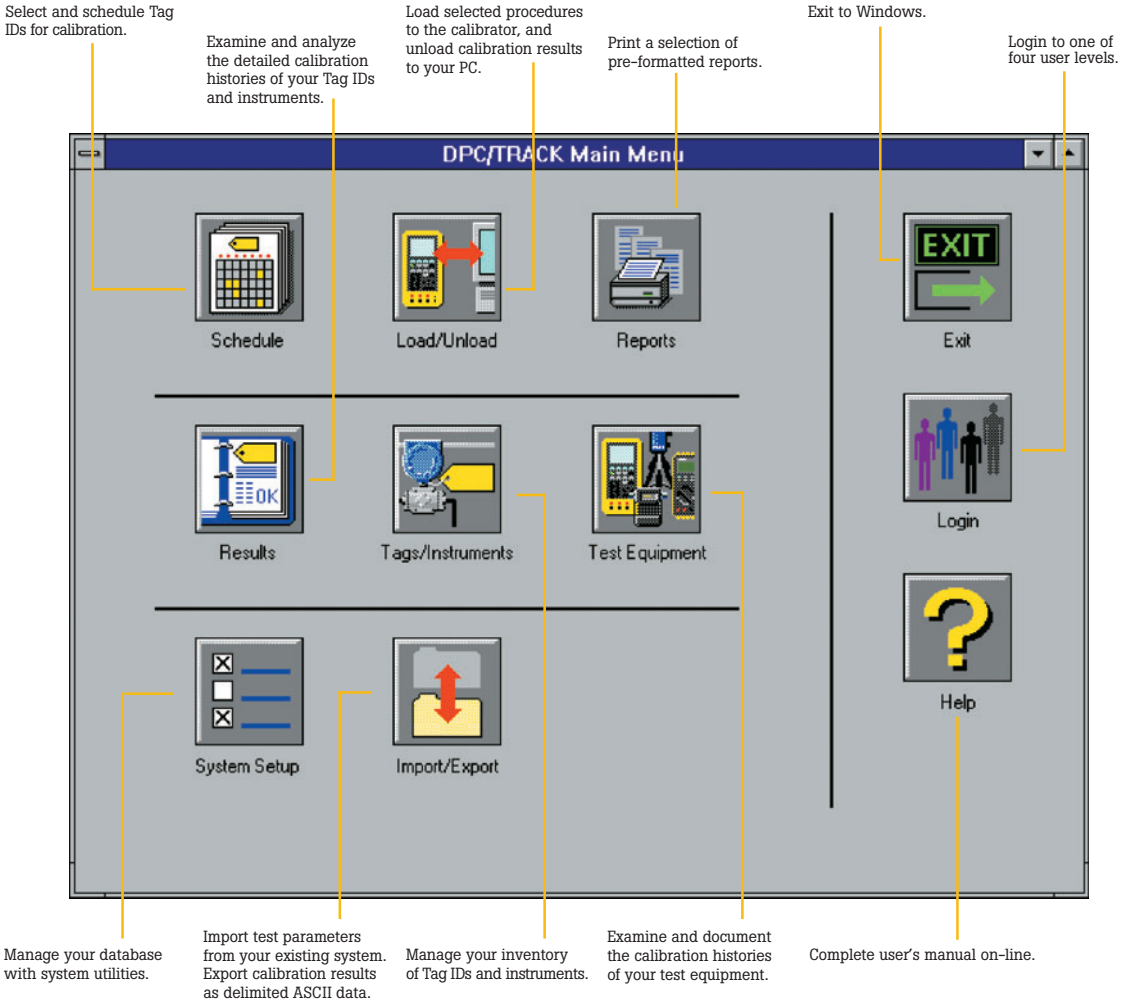
- Is supported by all of the major suppliers of process field instruments supported by the HART Communication Foundation, an industry-wide non-profit organization. See the Web site HYPERLINK http://www.hartcomm.org for information on the HART standard.
- Preserves present control strategies.
- Allows traditional 4–20 mA signals and digital communication to share the same two-wire loops.
- Provides important information for installation and maintenance: Tag IDs, measured values, range and span data, product information and diagnostics.
- Reduces operation costs by making it easier to manage and fully utilize "smart" instrument networks.

New Fluke 707 Loop Calibrator

The fast, one-handed tool for loop checks
This feature-rich solution combines the best features of a push-button and knob-base loop calibrator and offers:

- Large display and simple, quick-click interface for easy one-handed operation.
- Simultaneous mA and % readout for quick, easy, interpretation of readings.
- mA accuracy of 0.015%, superior to other loop calibrators in this price range.
- 1 µA resolution for mA source, simulate and measure.
- Push button 25% steps for fast, easy linearity checks.
- 0–100% "span check" for fast confirmation of zero and span.
- Selectable slow ramp, fast ramp, and step ramp to provide smooth outputs for valve slewing and loop functional tests.
- 24 volt internal loop supply, so you can power and read a transmitter at the same time without carrying a DMM.
- Measures V dc to 28 V.
- Single 9 V battery that is easily changed.
- 0–20 mA or 4–20 mA default start up modes.
- Innovative output adjustment dial with 1 µA and 100 µA resolution.
- HART™ mode connects 250 Ω resistor in series with 24 V loop for compatibility with HART communicators.

Automatically Record and Document Your Work



Fluke 700SW DPC/TRACK software includes an instrumentation database that makes it easy to manage your instrumentation, create and schedule tests, load and unload the 743 or 744, print a variety of standard reports, and manage calibration data.

DPC/TRACK is available in English, French, German, Spanish, and Italian.

Print standard reports automatically. The software assembles pre-formatted reports from your database files, saving time and reducing errors. Reports include calibration certificates, instruments due for calibration, inventory characteristics, calibration histories, calibration procedures, and traceability to instruments touched.

Documentation of results

The scheduling of calibrations, creation of procedures and documentation of your calibration results are facilitated by a number of instrumentation management software packages:

Cornerstone
The Open Platform for Instrument Management
Cal Station and Base Station

Fluke DPC/TRACK™

AMS aware™
AMS from Emerson Process Management, (formerly Fisher-Rosemount).

Honeywell Loveland™
DocuMint

BLUE MOUNTAIN QUALITY RESOURCES ™

Prime Technologies
ProCal 2000

On Time Support
Process/Track

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To see the Fluke 740 Series calibrators in action, call 1 800 44 FLUKE (U.S.), 31 40 2 675 200 (Europe), 1 425 446 5500 (other countries), or your local Fluke representative for a demo. Visit our Web site: www.fluke.com/Processtools

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Measurement Function Specifications

DC voltage measurement

Range (full scale)	Accuracy (% of reading + % of full scale)	
	1 year	2 years
110.000 mV	0.025% + 0.015%	0.05% + 0.015%
1.10000 V	0.025% + 0.005%	0.05% + 0.005%
11.0000 V	0.025% + 0.005%	0.05% + 0.005%
110.000 V	0.05% + 0.005%	0.1% + 0.005%
300.00 V	0.05% + 0.005%	0.1% + 0.005%

Temperature coefficient: (0.001% reading + 0.0015% f.s.)/°C from –10 °C to 18 °C and 28 °C to 50 °C
Input impedance: 5 MΩ
Common mode error: 0.008% f.s./(Common Mode Volt)
Maximum input voltage: 300 V rms

AC voltage measurement

Frequency range	Accuracy (% of reading + counts)	
	1 year	2 years
20 to 40 Hz	2% + 10	2% + 10
40 to 500 Hz	0.5% + 5	0.5% + 5
500 Hz to 1 kHz	2% + 10	2% + 10
1 to 5 kHz	10% + 20	10% + 20

Ranges: 1.1000, 11.000, 110.00, 300.0 V
Specifications apply for 10% to 100% of range
Input impedance: 5 MΩ and <100 pF
Input coupling: AC only
Temperature coefficient:
10% of spec/°C from –10 °C to 18 °C and 28 °C to 50 °C
Maximum input voltage: 300 V rms
Minimum input voltage: 0.5 V above 1 kHz

DC current measurement

Range (full scale)	Accuracy (% of reading + % of full scale)	
	1 year	2 years
30.000 mA	0.01% + 0.015%	0.02% + 0.015%
110.00 mA	0.01% + 0.015%	0.02% + 0.015%

Temperature coefficient: (0.001% reading + 0.002% f.s.)/°C from –10 °C to 18 °C and 28 °C to 50 °C
Common mode error: 0.01% f.s./(Common Mode Volt)
Maximum input voltage: 30 V dc

Resistance measurement

Range (full scale)	Accuracy (% of reading + ohms)	
	1 year	2 years
11.000 Ω	0.05% + 50 mΩ	0.075% + 50 mΩ
110.00 Ω	0.05% + 50 mΩ	0.075% + 50 mΩ
1.1000 kΩ	0.05% + 0.5 Ω	0.075% + 0.5 Ω
11.000 kΩ	0.1% + 10 Ω	0.1% + 10 Ω

Temperature coefficient: (0.01% f.s. + 2 mΩ)/°C from –10 °C to 18 °C and 28 °C to 50 °C
Common mode error: 0.005% f.s./(Common Mode Volt)
Maximum input voltage: 30 V dc
Continuity: Continuous tone <25 Ω, No tone >400 Ω

Frequency measurement

Range	Accuracy	
	1 year	2 years
1.00 to 109.99 Hz	0.05 Hz	0.05 Hz
110.0 to 1099.9 Hz	0.5 Hz	0.5 Hz
1.100 to 10.999 kHz	0.005 kHz	0.005 kHz
11.00 to 50.00 kHz	0.05 kHz	0.05 kHz

For frequencies <109.99 Hz, specification applies for signals with slew rates >5 V/ms
Minimum amplitude for Hz measurement: (Squarewaves) 1 Hz to 1 kHz, 300 mV p-p; 1 kHz to 30 kHz, 1.4 V p-p; >30 kHz, 2.8 V p-p
Maximum input: 1 Hz to 1 kHz, 300 V rms; >1 kHz, 30 V rms
Input impedance: 5 MΩ

Sourcing (Simulation) Function Specifications

DC voltage output

Range (full scale)	Accuracy (% of output + % of full scale)	
	1 year	2 years
110.000 mV	0.01% + 0.005%	0.015% + 0.005%
1.10000 V	0.01% + 0.005%	0.015% + 0.005%
15.0000 V	0.01% + 0.005%	0.015% + 0.005%

Temperature coefficient: (0.001% output + 0.001% f.s.)/°C from –10 °C to 18 °C and 28 °C to 50 °C
Maximum output current: 10 mA
Loading: (0.001% f.s. +1 μV)/mA
Common mode error: 0.008% f.s./(Common Mode Volt)
Maximum input voltage: 30 V dc

DC current output

Range (full scale)	Accuracy (% of output + % of full scale)	
	1 year	2 years
22.000 mA	0.01% + 0.015%	0.02% + 0.015%
Current sink (simulate transmitter)	0.02% + 0.03%	0.02% + 0.03%

Specification applies from 2 to 22 mA; below 2 mA typical accuracy is 0.15% of full scale
Maximum burden voltage: 24 V
Temperature coefficient: (0.003% output + 0.003% f.s.)/°C from –10 °C to 18 °C and 28 °C to 50 °C
Common mode error: 0.008% f.s./(Common Mode Volt)
Maximum input voltage: 30 V dc

Resistance sourcing

Range (full scale)	Accuracy (% of output + ohms)	
	1 year	2 years
11.000 Ω	0.01% + 20 mΩ	0.02% + 20 mΩ
110.00 Ω	0.01% + 40 mΩ	0.02% + 40 mΩ
1.1000 kΩ	0.02% + 0.5 Ω	0.03% + 0.5 Ω
11.000 kΩ	0.03% + 5 Ω	0.04% + 5 Ω

Temperature coefficient: 0.01% f.s./°C from –10 °C to 18 °C and 28 °C to 50 °C
Maximum and minimum current through source resistance:

	Maximum	Minimum
11 Ω range:	3 mA dc	0.1 mA dc
110 Ω range:	3 mA dc	0.1 mA dc
1.1 kΩ range:	3 mA dc	0.01 mA dc
11 kΩ range:	1 mA dc	0.01 mA dc

Common mode error: 0.008% f.s./(Common Mode Volt)
Maximum input voltage: 30 V dc

Frequency sourcing

Range	Accuracy	
	1 year	2 years
0.00 to 10.99 Hz	0.01 Hz	0.01 Hz
11.00 to 109.99 Hz	0.1 Hz	0.1 Hz
110.0 to 1099.9 Hz	0.1 Hz	0.1 Hz
1.100 to 21.999 kHz	0.002 kHz	0.002 kHz
22.000 to 50.000 kHz	0.005 kHz	0.005 kHz

Waveforms: Squarewave w/50% duty cycle, sinewave
Amplitude: 0.1 to 10 V p-p
Amplitude accuracy: 3% of output + 0.5% of f.s., 1 to 1099 Hz; 10% of output + 0.5% of f.s., 1.1 to 10.9 kHz; 30% of output + 0.5% f.s., 11 to 50 kHz
Maximum input voltage: 30 V dc

Temperature Measurement and Simulation Specifications

Temperature, RTDs

	Accuracy			
	Measure		Source	
Type and range	1 year	2 years	1 year	2 years
10 Ω Cu (427)				
–100 to 0 °C	2 °C	2 °C	1 °C	1 °C
0 to 260 °C	2 °C	2 °C	1 °C	1 °C
100 Ω Pt (3916)				
–200 to –190 °C	0.3 °C	0.4 °C	0.3 °C	0.4 °C
–190 to 0 °C	0.3 °C	0.4 °C	0.1 °C	0.2 °C
0 to 630 °C	0.5 °C	0.8 °C	0.2 °C	0.4 °C
100 Ω Pt (3926)				
–200 to 0 °C	0.3 °C	0.4 °C	0.1 °C	0.2 °C
0 to 630 °C	0.5 °C	0.8 °C	0.2 °C	0.4 °C
100 Ω Pt (385)				
–200 to 0 °C	0.3 °C	0.5 °C	0.1 °C	0.2 °C
0 to 400 °C	0.5 °C	0.8 °C	0.2 °C	0.4 °C
400 to 800 °C	0.8 °C	1.0 °C	0.4 °C	0.5 °C
200 Ω Pt (385)				
–200 to 0 °C	0.3 °C	0.5 °C	0.1 °C	0.2 °C
0 to 400 °C	0.5 °C	0.8 °C	0.2 °C	0.4 °C
400 to 630 °C	0.8 °C	1.0 °C	0.4 °C	0.5 °C
500 Ω Pt (385)				
–200 to 0 °C	0.3 °C	0.5 °C	0.1 °C	0.2 °C
0 to 400 °C	0.5 °C	0.8 °C	0.2 °C	0.4 °C
400 to 630 °C	0.8 °C	1.0 °C	0.4 °C	0.5 °C
1000 Ω Pt (385)				
–200 to 0 °C	0.3 °C	0.5 °C	0.1 °C	0.2 °C
0 to 400 °C	0.5 °C	0.8 °C	0.2 °C	0.4 °C
400 to 630 °C	0.8 °C	1.0 °C	0.4 °C	0.5 °C
120 Ω Ni (672)				
–80 to 260 °C	0.3 °C	0.4 °C	0.1 °C	0.2 °C

For 2-wire and 3-wire measurements add 0.4 °C
Sensor inaccuracies not included

Resolution: 0.1 °C, except 1 °C for 10 Ω Cu
Temperature coefficient: 0.02 °C/°C from –10 °C to 18 °C and 28 °C to 50 °C
Maximum input voltage: 30 V dc
Maximum input current for RTD Source function:

10 Ω RTD	8 mA dc
100, 120 Ω RTDs	8 mA dc*
200, 500, 1000 Ω RTDs	1 mA dc

741B*, 743B*, 744: Addresses pulsed transmitters and PLCs with pulses as short as 1 ms

* For 741B serial number 7935XXXX and greater.
For 743B serial number 7940XXXX and greater.
Otherwise, 3 mA and 100 ms.

How to compare calibrators based on specifications.

Analyzing specifications can be complex. To get a true picture of calibrator performance, you should be aware of the key components of a specification and how to interpret them. Specifications must be carefully considered when comparing calibrators from different vendors. The most important components of a process calibrator specification are:

- Reference uncertainty. Performance of a calibrator at 23 °C ± 3°C at the time it is verified by the manufacturer. This specification does not include the effects of time and temperature, two of the largest components of calibrator error.
- Time. Fluke 740 Series calibrators are delivered with both one-year and two-year specs, to limit your calibration support costs. You choose your cal interval based upon the performance you need.
- Temperature. Fluke process calibrator specs reflect performance from 18 ° to 28 °C. Compensation factors are provided to permit specified use of the calibrators over a wide –10 ° to 50 °C range.
- Allowance for traceability. Fluke specs are not relative specs, but total specs, including an allowance for uncertainty of standards that provide traceability to national standards.
- Confidence level. Fluke uses a conservative 95% confidence level when setting specifications, increasing your confidence that your calibrator will remain in spec for its stated calibration interval.

For more information, refer to the application note "Understanding Specifications For Process Calibrators."

Temperature, Thermocouples

	Accuracy			
	Measure		Source	
Type and range	1 year	2 years	1 year	2 years
E				
–250 to –200 °C	1.3 °C	2.0 °C	0.6 °C	0.9 °C
–200 to –100 °C	0.5 °C	0.8 °C	0.3 °C	0.4 °C
–100 to 600 °C	0.3 °C	0.4 °C	0.3 °C	0.4 °C
600 to 1000 °C	0.4 °C	0.6 °C	0.2 °C	0.3 °C
N				
–200 to –100 °C	1.0 °C	1.5 °C	0.6 °C	0.9 °C
–100 to 900 °C	0.5 °C	0.8 °C	0.5 °C	0.8 °C
900 to 1300 °C	0.6 °C	0.9 °C	0.3 °C	0.4 °C
J				
–210 to –100 °C	0.6 °C	0.9 °C	0.3 °C	0.4 °C
–100 to 800 °C	0.3 °C	0.4 °C	0.2 °C	0.3 °C
800 to 1200 °C	0.5 °C	0.8 °C	0.2 °C	0.3 °C
L				
–200 to –100 °C	0.6 °C	0.9 °C	0.3 °C	0.4 °C
–100 to 800 °C	0.3 °C	0.4 °C	0.2 °C	0.3 °C
800 to 900 °C	0.5 °C	0.8 °C	0.2 °C	0.3 °C
K				
–200 to –100 °C	0.7 °C	1.0 °C	0.4 °C	0.6 °C
–100 to 400 °C	0.3 °C	0.4 °C	0.3 °C	0.4 °C
400 to 1200 °C	0.5 °C	0.8 °C	0.3 °C	0.4 °C
1200 to 1372 °C	0.7 °C	1.0 °C	0.3 °C	0.4 °C
T				
–250 to –200 °C	1.7 °C	2.5 °C	0.9 °C	1.4 °C
–200 to 0 °C	0.6 °C	0.9 °C	0.4 °C	0.6 °C
0 to 400 °C	0.3 °C	0.4 °C	0.3 °C	0.4 °C
U				
–200 to 0 °C	0.6 °C	0.9 °C	0.4 °C	0.6 °C
0 to 600 °C	0.3 °C	0.4 °C	0.3 °C	0.4 °C
B				
600 to 800 °C	1.3 °C	2.0 °C	1.0 °C	1.5 °C
800 to 1000 °C	1.0 °C	1.5 °C	0.8 °C	1.2 °C
1000 to 1820 °C	0.9 °C	1.3 °C	0.8 °C	1.2 °C
R				
–20 to 0 °C	2.3 °C	2.8 °C	1.2 °C	1.8 °C
0 to 100 °C	1.5 °C	2.2 °C	1.1 °C	1.7 °C
100 to 1767 °C	1.0 °C	1.5 °C	0.9 °C	1.4 °C
S				
–20 to 0 °C	2.3 °C	2.8 °C	1.2 °C	1.8 °C
0 to 200 °C	1.5 °C	2.1 °C	1.1 °C	1.7 °C
200 to 1400 °C	0.9 °C	1.4 °C	0.9 °C	1.4 °C
1400 to 1767 °C	1.1 °C	1.7 °C	1.0 °C	1.5 °C
C				
0 to 800 °C	0.6 °C	0.9 °C	0.6 °C	0.9 °C
800 to 1200 °C	0.8 °C	1.2 °C	0.7 °C	1.0 °C
1200 to 1800 °C	1.1 °C	1.6 °C	0.9 °C	1.4 °C
1800 to 2316 °C	2.0 °C	3.0 °C	1.3 °C	2.0 °C

Sensor inaccuracies not included
Accuracy with external cold junction; for internal junction add 0.2 °C
Resolution: 0.1 °C
Temperature scale: ITS-90 or IPTS-68, selectable
Compensation: ITS-90 per NIST Monograph 175 for E, N, J, K, T, B, R, S thermocouples; IPTS-68 per IEC 584-1 for E, J, K, T, B, R, S thermocouples; IPTS-68 per DIN 43710 for L, U thermocouples
Temperature coefficient: 0.05 °C/°C from –10 °C to 18 °C and 28 °C to 50 °C
Common mode error: 0.01 °C/(Common Mode Volt)
Maximum input voltage: 30 V dc

Note: When simulating temperature in As Found/As Left procedures, steps may be either linear by temperature or linear by mV potential.

FLUKE®

Pressure Specifications

The Fluke family of 29 pressure modules:

Covers virtually any pressure application including gage, differential, dual (compound), absolute, and vacuum.

- Display pressure readings in any of 10 different pressure units you specify in the calibrator setup.
- Rugged urethane molded cases protect the modules from rough handling and harsh conditions.
- Features internal temperature compensation from 0° to 50 °C for full-accuracy performance.
- Includes NIST-traceable calibration certificate.
- Modules can be calibrated locally, helping to control costs.

Pressure module specifications (all specifications in % of full span. Specifications reflect a confidence interval of 95%.)

Model	Range/ Resolution	Range (approx)/ Resolution	Reference uncertainty (23 ± 3 °C)	Stability (1 year)	Temperature (0 to 50 °C)	Total[1] uncertainty	High[2] side media	Low[2] side media	Fitting material	Max over-pressure (x nominal)
Differential										
FLUKE-700P00	1 in. H_2O/0.001	0.25 kPa/0.0002	0.300	0.025	0.025	0.350	Dry	Dry	316 SS	30x
FLUKE-700P01	10 in. H_2O/0.01	2.5 kPa/0.002	0.200	0.050	0.050	0.300	Dry	Dry	316 SS	3x
FLUKE-700P02	1 psi/0.0001	6900 Pa/0.7	0.150	0.070	0.080	0.300	Dry	Dry	316 SS	3x
FLUKE-700P22	1 psi/0.0001	6900 Pa/0.7	0.100	0.020	0.030	0.150	316 SS	Dry	316 SS	3x
FLUKE-700P03	5 psi/0.0001	34 kPa/0.001	0.050	0.020	0.030	0.100	Dry	Dry	316 SS	3x
FLUKE-700P23	5 psi/0.0001	34 kPa/0.001	0.025	0.010	0.015	0.050	316 SS	Dry	316 SS	3x
FLUKE-700P04	15 psi/0.001	103 kPa/0.01	0.025	0.010	0.015	0.050	Dry	Dry	316 SS	3x
FLUKE-700P24	15 psi/0.001	103 kPa/0.01	0.025	0.010	0.015	0.050	316 SS	Dry	316 SS	3x
Gage										
FLUKE-700P05	30 psi/0.001	207 kPa/0.01	0.025	0.010	0.015	0.050	316 SS	N/A	316 SS	3x
FLUKE-700P06	100 psi/0.01	690 kPa/0.07	0.025	0.010	0.015	0.050	316 SS	N/A	316 SS	3x
FLUKE-700P27	300 psi / 0.01	2070 kPa / 0.1	0.025	0.010	0.015	0.050	316 SS	N/A	316 SS	3x
FLUKE-700P07	500 psi/0.01	3400 kPa/0.1	0.025	0.010	0.015	0.050	316 SS	N/A	316 SS	3x
FLUKE-700P08	1000 psi/0.1	6900 kPa/0.7	0.025	0.010	0.015	0.050	316 SS	N/A	316 SS	3x
FLUKE-700P09	1500 psi/0.1	10 MPa/0.001	0.025	0.010	0.015	0.050	316 SS	N/A	316 SS	2x
Absolute (not compatible with Fluke 701 or 702)										
FLUKE-700PA3	5 psi/0.0001	34 kPa/0.001	0.050	0.010	0.010	0.070	316 SS	N/A	316 SS	3x
FLUKE-700PA4	15 psi/0.001	103 kPa/0.01	0.050	0.010	0.010	0.070	316 SS	N/A	316 SS	3x
FLUKE-700PA5	30 psi/0.001	207 kPa/0.01	0.050	0.010	0.010	0.070	316 SS	N/A	316 SS	3x
FLUKE-700PA6	100 psi/0.01	690 kPa/0.07	0.050	0.010	0.010	0.070	316 SS	N/A	316 SS	3x
Vacuum (not compatible with Fluke 701 or 702)										
FLUKE-700PV3	-5 psi/0.0001	-34 kPa/0.001	0.040	0.015	0.015	0.070	316 SS	Dry	316 SS	3x
FLUKE-700PV4	-15 psi/0.001	-103 kPa/0.01	0.040	0.015	0.015	0.070	316 SS	Dry	316 SS	3x
Dual										
FLUKE-700PD2	± 1 psi/0.0001	± 6900 Pa/0.7	0.150	0.025	0.025	0.200	316 SS	Dry	316 SS	3x
FLUKE-700PD3	± 5 psi/0.0001	± 34 kPa/0.001	0.040	0.015	0.015	0.070	316 SS	Dry	316 SS	3x
FLUKE-700PD4	± 15 psi/0.001	± 103 kPa/0.01	0.025	0.010	0.015	0.050	316 SS	Dry	316 SS	3x
FLUKE-700PD5	-15/30 psi/0.001	-100/207 kPa/0.01	0.025	0.010	0.015	0.050	316 SS	N/A	316 SS	3x
FLUKE-700PD6	-15/100 psi/0.01	-100/690 kPa/0.07	0.025	0.010	0.015	0.050	316 SS	N/A	316 SS	3x
FLUKE-700PD7	-15/200 psi/0.01	-100/1380 kPa/0.1	0.040	0.015	0.015	0.070	316 SS	N/A	316 SS	3x
High										
FLUKE-700P29	3000 psi/0.1	20.7 M Pa/0.001	0.050	0.010	0.020	0.080	C276	N/A	C276	2x
FLUKE-700P30	5000 psi/0.1	34 M Pa/0.001	0.050	0.010	0.020	0.080	C276	N/A	C276	2x
FLUKE-700P31	10000 psi/1	69 M Pa/0.007	0.050	0.010	0.020	0.080	C276	N/A	C276	1.5x

[1] Total uncertainty, one year for temperature range 0 °C to +50 °C. Total uncertainty, 1.0% of full span for temperature range -10 °C to 0 °C. For P00 module only, compensated temperature range is 15 ° to 35 °C.

[2] "Dry" indicates dry air or non-corrosive gas as compatible media. "316 SS" indicates media compatible with Type 316 Stainless Steel. "C276" indicates media compatible with Hastelloy C276.

Use of pressure zero is required prior to measurement or source. Maximum overpressure specification includes common mode pressure. Modules are CE rated. Metric adapter(s): 1/4" NPT female to male BSP/ISO 1/4-19, tapered thread, included with all modules except P29, P30, and P31. Effective October 1996, all modules include a NIST traceable certificate and test data.

General Specifications

Data log function (except 741B)
Measure functions: Voltage, current, resistance, frequency, temperature, pressure
Reading rate: 1, 2, 5, 10, 20, 30, or 60 readings per minute
Maximum record length: 8000 readings (7980 for 30 or 60 readings per minute)

Ramp function
Source functions: Voltage, current, resistance, frequency, temperature
Rate: 4 steps/second
Trip detect: Continuity* or voltage

**Continuity detection not available when sourcing current*

Loop power function
Voltage: Selectable, 24 V or 28 V
Accuracy: 5%
Maximum current: 22 mA, short-circuit protected
Maximum input voltage: 30 V dc

Note: 250Ω series resistance is automatically supplied whenever loop power is enabled on 744.

HART modem interface (744 only)
Maximum input voltage: 30 V dc

Environmental specifications
All calibrator specifications apply from +18 °C to +28 °C unless stated otherwise.
Operating temperature: -10 °C to 50 °C, (-20°C typical except for frequency and ac voltage measurement)
Storage temperature: -20 °C to 60 °C
Operating altitude: 2800 m above mean sea level (9186 ft)
90-day specifications: The standard specification intervals for the 740 Series are 1 and 2 years. Typical 90-day measurement and source accuracy can be estimated by dividing the one year "% of reading" or "% of output" specifications by 2. Floor specifications, expressed as "% of f.s." or "counts" or "ohms" remain constant.

Power: Internal battery pack NiCd, 7.2 V, 1700 mAh; NiMH (744 only) 7.2 V, 3500 mAh
Battery Life: Typical usage, >8 hours
Dimensions: 130 x 236 x 61 mm (5.1 x 9.3 x 2.4 in.)
Weight: 1.4 kg (3 lbs. 1 oz.)
Side Port Connections:
- Pressure module connector
- RS-232 connector (743B and 744) to interface to your PC
- Connection for optional battery eliminator

Safety: Complies with CAN/CSA C22.2 No 1010.1-92, ANSI/ISA S82.01-1994, UL3111, and EN610-1:1993.
Data Storage Capacity:
Fluke 741B—1 day of calibration results
Fluke 743B and 744—1 week of calibration results

Ordering Information

FLUKE-741B Documenting Process Calibrator
FLUKE-743B Documenting Process Calibrator
FLUKE-744 Documenting Process Calibrator-HART
Included with the Fluke 740 Series:
Type TL24 Industrial Test Leads (two sets), AC20 Test Clips (2 sets), TP20 Test Probes (1 set), Battery Pack, Battery Charger, serial port cable (except 741B), HART communications cable (744 only), DPC/TRACK Sample with free PC communication utility software (except 741B), Instruction Manual, NIST-traceable calibration report and data, three-year warranty.

FLUKE-700SW DPC/TRACK Software (for use with Model 743B or 744 calibrators)
Included with DPC/TRACK software:
Software media, Instruction Manual, Serial Port Cable, DB9 to DB25 (9 pin to 25 pin) Adapter.

FLUKE-700 Pxx Pressure Modules
Included with each Fluke Pressure Module:
BP-ISO Adapter(s) (except with P29 - P31), Instruction Sheet, NIST traceable calibration report and data, one-year warranty.

Accessories

Fluke-700PMP	Pressure Pump; 100 psi/7 bar
Fluke-700LTP	Low Pressure Test Pump
Fluke-700PTP	Pneumatic Test Pump; 360 psi/25 bar
Fluke-700HTP	Hydraulic Test Pump; 10,000 psi/ 700 bar
Fluke-700HTH	Hydraulic Test Hose
Fluke-700PRV	Pressure Relief Valve Kit for HTP
Fluke-700-IV	Current Shunt (for mA/mA applications)
Fluke-700PCK	Pressure Calibration Kit
Fluke-700BCW	Bar Code Wand
Fluke-700TC1	TC Mini-Plug Kit, 9 types
Fluke-700TC2	TC Mini-Plug Kit, JKTERS
80T-IR	Infrared Probe
80PK-IR	Infrared Probe
BE9005	Battery Eliminator
BC7217	Battery Charger
BP7217	NiCd Battery Pack
BP7235	NiMH Battery Pack
C700	Hard Carrying Case
C781	Soft Carrying Case
C789	Soft Carrying Case
C75	Test Lead Case

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