TECHNICAL DATA

Fluke 744 Documenting Process Calibrator-HART

Key features

The 744 is a power multifunction documenting calibrator that lets you download procedures, lists, and instructions created with software-or upload data for printing, archiving, and analysis. The 744 also features a powerful built in HART® interface capable of performing nearly all the day-to-day tasks you now perform with a separate communicator.

- Measure volts, mA, RTDs, thermocouples, frequency, and ohms to test sensors, transmitters and other instruments
- Source/simulate volts, mA, thermocouples, RTDs, frequency, ohms, and pressure to calibrate transmitters
- Power transmitters during test using loop supply with simultaneous mA measurement
- Measure/source pressure using any of 29 Fluke 700Pxx Pressure Modules
- Create and run automated as-found/as-left procedures to satisfy quality programs or regulations. Record and document results
- Holds up to a full week of downloaded procedures and calibration results
- Use many features like autostep, custom units, user entered values during test, one-point and two-point switch testing, square root DP flow testing, programmable measurement delay etc.
- Easy to use
- Three year warranty
- Bright white dual display. Read both sourced and measured parameters simultaneously.
- Multi lingual interface
- Rechargeable NiMH battery for 10 hour uninterrupted use. Includes gas gauge.
- Handling of fast pulsed RTD transmitters and PLCs, with pulses as short as 1 ms
- Delivered with DPC/Track Sample software
- Compatible with many Asset Management software packages

Product overview: Fluke 744 Documenting Process Calibrator-HART

Ready for Anything

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 to deliver an integrated communicating calibrator. This rugged, reliable tool is ideal for calibrating, maintaining, and troubleshooting HART and other instrumentation.

The 744 does the work of several tools - sourcing, simulating and measuring pressure, temperature, and electrical signals in one rugged, hand-held device.

For documentation, the 744 automates calibration procedures and captures your data. And, of course, it helps you meet rigorous standards like ISO 9000, FDA, EPA and OSHA regulations.

HART Capabilities

- 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.
- 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 devise-specific command support than any other HART

field calibrator.
- Works with multiple masters, burst mode, and multi-drop configurations.
- Is easy to update as additional instruments are added and new HART versions are released.
- Interrogate to determine device type, manufacturer, model, tag.
- Reconfigure the sensor mapping of dual sensor temperature transmitters.
- 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.
- Re-label smart transmitters by reading and writing to the HART tag field.

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.

HART Operating Modes Supported

- 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.

744 V 2.5 Documenting Process Calibrator Software Upgrade

The Fluke 744 Version 2.5 software upgrade includes:

- **Device-specific calibration support for new instruments:**
- Micro Motion 2000, 2000 IS, 9701, 9712 and 9739 coriolis flow transmitters
- Fuji FCX and FCXA2 pressure and FRC temperature transmitter
- **New features:**
- Support for New Hart Scientific dry blocks: 7103, 9007, 9011, 9023, 9103, 9105, 9107, 9122, 9127, 9132, 9133 and 9150
- Enhanced dry block delay setting for temperature switch testing
- Switch test without reset

The upgrade is delivered on a floppy disk. One upgrade disk is required for each calibrator to be upgraded. Download from your PC to your calibrator using the serial cable originally supplied with your Fluke 744 Calibrator. Elapsed time for the process will be about 8 minutes. After the upgrade is complete, your calibrator will indicate “Version 2.5” at start up.

The 2.5 upgrade is available from your regular Fluke dealer or representative as Fluke 744V20. For an available five-pack, ask for Fluke-744V2V.

Pressure Modules

Covers virtually any pressure application including gauge, 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.

A family of 29 optional pressure modules provides pressure calibration and measurement capabilities. Twenty-eight modules are available, with basic accuracy specs to 0.05%. Ranges start at 0 — 1 in H20 (0 — .25kPa) and go to 0 — 10,000 psi (0 — 70,000 kPa). Additional information about pressure modules is available on the Pressure Modules Home Page.

Automated Procedures

Allow you to quickly set up powerful, automated calibration procedures for linear transmitters, DP flow transmitters, and one- and two-point limit switches. Simply select the appropriate measure and/or source functions and fill out the procedure template. The 740 Series does the rest. It quickly performs the test, calculates the errors, and displays the final results, highlighting out of tolerance points.

Custom Units

Enable you to map one unit to another, such as mV to °C or °F. Allows you to use the Fluke 740 Series with millivolt output accessories such as the Fluke 80T-IR Temperature Probe, and to document tests using non-supported units such as parts per million or revolutions per minute.

User-entered Values

Enables technicians to record calibration results that were sourced and/or measured by other devices such as panel meters or readout-only devices.

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.

Additional Features

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. Get up to speed in minutes, not days. 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 744 captures your calibration results, eliminating the need to juggle a pen and pad in the field. The RS-232 interface lets you transfer the results to a PC, thus saving the time of having to manually transcribe them when you return to the shop.

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 NiMH battery pack.

Rugged and reliable
Count on Fluke's rugged design to deliver top accuracy and reliability in harsh environments. Overmolded urethane case stands up to rough handling in industrial environments.

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.

Multi-lingual interface
Displays instructions in English, French, German, Spanish, and Italian.

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.

Specifications: Fluke 744 Documenting Process Calibrator-HART

Measurement Accuracy		
Voltage DC	110.000 mV	0.025%+0.015% *
	1.10000 V	0.025%+0.005% *
	11.0000 V	0.025%+0.005% *
	110.000 V	0.05%+0.005% *
	300.00 V	0.05%+0.005% *

Voltage AC	20 to 40 Hz	2% + 10
	40 to 500 Hz	0.5% + 5
	500 to 1 kHz	2% + 10
	1 kHz to 5 kHz	10% + 20
	Ranges:	1.1000, 11.000, 110.00, 300V
Current DC	30.000 mA	0.01% + 0.015% *
	110.00 mA	0.01% + 0.015% *
Resistance	11.000 Ω	0.05% + 50 mΩ
	110.00 Ω	0.05% + 50 mΩ
	1.1000 kΩ	0.05% + 500 mΩ
	11.000 kΩ	0.1% + 10 Ω
Frequency	1.00 to 109.99 Hz	0.05 Hz
	110.0 to 1099.9 Hz	0.5 Hz
	1.100 to 10.999 kHz	5 Hz
	11.00 to 50.00 kHz	50 Hz
Pressure	**Accuracy** from 0.025% of range using any of 29 pressure modules. Modules available for differential, gauge, vacuum, absolute, dual and high pressure. (for detailed specifications refer to pressure modules in options and accessories)	
Note	* (% of reading + % of full scale)	

Source Accuracy		
Voltage DC	110.000 mV	0.01%+0.005% *
	1.10000 V	0.01%+0.005% *
	15.0000 V	0.01%+0.005% *
Current DC	22.000 mA (Source)	0.01%+ 0.015% *
	22.000 mA (Simulate)	0.02% + 0.03% *
Resistance	11.000 Ω	0.01% + 20 mΩ
	110.00 Ω	0.01% + 40 mΩ
	1.1000 kΩ	0.02% + 500 mΩ
	11.000 kΩ	0.03% + 5Ω
Frequency	0.00 to 10.99 Hz	0.01 Hz
	11.00 to 109.99 Hz	0.1 Hz
	110.0 to 1099.9 Hz	0.1 Hz
	1100 to 21999 Hz	2 Hz
	22.000 to 50.000 kHz	5 Hz
Note	* (% of reading + % of full scale)	
RTDs and Thermocouples		

Measure Accuracy:	10 Ω Cu (427):	2 °C
	100 Ω Pt (3916):	0.3 °C
	100 Ω Pt (3926):	0.3 °C
	100 Ω Pt (385):	0.3 °C
	200 Ω Pt (385):	0.3 °C
	500 Ω Pt (385):	0.3 °C
	1000 Ω Pt (385):	0.3 °C
	120 Ω Ni (672):	0.3 °C
	note:	For 2-and 3-wire measurement, add 0.4°C
	E:	0.3 °C
	N:	0.5 °C
	J:	0.3 °C
	L:	0.3 °C
	K:	0.3 °C
	T:	0.3 °C
	U:	0.3 °C
	B:	0.9 °C
	R:	1.0 °C
	S:	0.9 °C
	C:	0.6 °C
	BP:	1.2 °C
	XK:	0.4 °C
	note:	Accuracy with exteal cold junction, for inteal junction add 0.2 °C

Source Accuracy:	10 Ω Cu (427):	1 °C
	100 Ω Pt (3916):	0.1 °C
	100 Ω Pt (3926):	0.1 °C
	100 Ω Pt (385):	0.1 °C
	200 Ω Pt (385):	0.1 °C
	500 Ω Pt (385):	0.1 °C
	1000 Ω Pt (385):	0.1 °C
	120 Ω Ni (672):	0.1 °C
	note:	For 2-and 3-wire simulation, add 0.4 °C
	E:	0.2 °C
	N:	0.3 °C
	J:	0.2 °C
	L:	0.2 °C
	K:	0.3 °C
	T:	0.3 °C
	U:	0.3 °C
	B:	0.8 °C
	R:	0.9 °C
	S:	0.9 °C
	C:	0.6 °C
	BP:	0.5 °C
	XK:	0.4 °C
	note:	Accuracy with exteal cold junction, for inteal junction add 0.2 °C

Technical Data		
Data Log Functions	Measure functions:	Voltage, current, resistance, frequency, temperature, pressure
	Reading rate:	1, 2, 5, 10, 20, 30, or 60 readings/minute
	Maximum record length:	8000 readings (7980 for 30 or 60 readings/minute)
Ramp Functions	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

Step Functions	Source Functions	Voltage, current, resistance, frequency, temperature
	Manual Step	Selectable step, change with arrow buons
	Autostep	Fully programmable for function, start delay, stepvalue, time per step, repeat

Environmental Specifications	
Operating Temperature	-10 °C to +50 °C
	-20 °C to +50 °C *
Storage Temperature	-20 °C to +60 °C
Dust/water resistance	Meets IP52, IEC 529
Operating Altitude	2800 m
Note	* Except frequency and AC

Safety Specifications	
Agency Approvals	CAN/CSA C22.2 No 1010.1-92, ASNI/ISA S82.01-1994, UL3111, and EN610-1:1993

Mechanical & General Specifications	
Size	130 x 236 x 61 mm (5.1“ x 9.3” x 2.4”)
Weight	1.4 kg (3 lbs., 1oz.)
Baeries	NiMH: 7.2V, 3.5 Ah
Baery Life	>10 hours typical
Baery Replacement	Via snap-shut door without opening calibrator; no tools required
Side port connections	Pressure module connector
	RS-232 connector for PC interface cable and for HART communication cable
	Connection for optional baery eliminator
Data storage capacity	1 week of calibration results
90 day specifications	The standard specification interval for the 744 is 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 full scale" or
	"counts" or "ohms" remain constant.

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