FLUKE®
Calibration

Technical data

Series 7250 Ruska Pressure Controller/Calibrator



The Series 7250 high speed digital pressure controllers represent the fifth generation of automatic pressure controllers from Fluke Calibration and offers unmatched performance, an active matrix color screen and enhanced control stability. Utilizing multiple sensors and ranges in a single instrument, the Series 7250 combines precision, stability, speed and affordability. Models 7250xi, 7250i and 7250, up to 2 500 psi (17.2 MPa), use a unique quartz sensor, the most accurate pressure sensing technology in a pressure calibrator. Each quartz sensor is manufactured and tested to provide the ultimate performance required by a Fluke Calibration pressure calibrator, ensuring that every customer receives quality, precision and stability in their instrument.

Advanced precision

Models 7250xi and 7250i offer advanced percent of reading precision for increased capability with a single instrument, reducing the investment required to calibrate a wide variety of pressure devices and ranges. The Model 7250xi provides 0.005 % of reading precision from 20 % to 100 % of the instrument's range. This unmatched precision is achieved through unique quartz pressure sensing technology and multiple quartz sensors in a single instrument. The 7250xi is available with any full scale range from 20 to 2 500 psi (140 kPa to 17.2 MPa). The Model 7250i provides 0.005 % of reading from 40 % to 100 % of range and is available with any full scale range from 5 to 2 500 psi (35 kPa to 17.2 MPa).

For pressure below the lower threshold of 20% for the 7250xi and 40 % for the 7250i, the precision becomes 0.005 % of the lower value. For example, a 1 000 psi (7 MPa) Model 7250xi provides 0.005 % of reading from 200 to 1 000 psi (1.4 MPa to 7 MPa); the precision for pressures from 0 to 200 psi (0 to 1.4 MPa) is 0.005 % of 200 psi (1.4 MPa).

Selecting the full scale range of the 7250xi and 7250i to purchase is simplified with the percent of reading capability. Simply determine the highest pressure required and then decide if 0.005 % of reading is required down to 40 % or 20 % to maintain the appropriate calibration ratio. The complex analysis associated with selecting the appropriate single or multirange instruments with percent of full scale performance is no longer required. And, since the performance of the 7250xi and 7250i is continuous throughout the range, the time consuming task of controlling to atmosphere and switching ranges is eliminated.

Features

- Pressure ranges from 0 to 5 and 0 to 3 000 psi (0 to 35 kPa and 0 to 21 MPa)
- Model 7250xi and 7250i provide advanced precision of 0.005 % of reading
- Model 7250 provides 0.003 % of full scale precision
- Stability: 0.0075 % of reading per year
- Time to setpoint: 20 seconds with no overshoot
- Control stability: 10 ppm
- Active matrix color screen with enhanced navigation menus
- Languages: English, French, Chinese, German, Japanese, Spanish and Italian

The 7250xi and 7250i not only provide unequalled precision, but also excellent long term stability due to the inherent properties of quartz in combination with several enhancements implemented over the last few years. The total uncertainty of the 7250xi and 7250i over a one year calibration interval is 0.009% of reading down to 20% and 40%, respectively. Simplified specifications eliminate guesswork and "specmanship" to allow you to determine the actual performance delivered with every instrument.

Standard precision

For applications that do not require the level of performance provided in the 7250xi or 7250i, the Model 7250 offers an economical approach to automatic pressure testing and calibration with a precision of 0.003% of full scale for ranges to 2 500 psi (17.2 MPa).

High pressure precision

For applications that require pressures up to 3 000 psi (21 MPa), the Model 7250HP provides total uncertainty (one year calibration interval) of 0.013% of reading down to 30% of the full scale. The 7250HP provides the high speed control and performance of the standard 7250 with a full scale pressure range of 3 000 psi (21 MPa) absolute.



The Series 7250 features a unique fused-quartz sensor. This rugged transducer offers unequalled precision and a stability of 0.0075% of reading per year.

High-speed pressure control

All Series 7250 instruments up to 2 500 psi (172 bar) reach setpoint in 20 seconds or less into a 15 cubic inch (245 cc) volume, with no overshoot, to allow high-speed pressure test and calibration.

Dual control modes

The Series 7250 also provides two user-selectable control modes: active and passive mode. In active mode, the 7250 is continually maintaining the setpoint and can compensate for small leaks and pressure changes due to temperature. In passive mode, the user defines a control band and the 7250 will turn off the controller once it achieves the setpoint within the control band. In a leak-free and temperature-stable system, passive mode contributes no additional uncertainty, providing optimum performance.

Automating pressure test and calibration

The 7250xi, 7250i and 7250 are easy to use and can automate your calibrations in several ways:

Step up/down: for calibrations where the increments are fixed intervals, enter a user-defined step value. The Series 7250 increases or decreases the pressure by the step amount with the jog dial—no more lengthy keystroke sequences to program.

Sweep test: for simple exercising routines, as with dial gauges, enter a start value, a stop value, and number of times to repeat the cycle. The Series 7250 will automatically exercise the device under test prior to the calibration run.

Onboard programs: For frequently used or lengthy calibrations, the Series 7250 can store up to 20 user-defined programs/profiles with up to 1000 steps total in internal memory.

Computer interface: Every Series 7250 is provided with both an RS-232 and IEEE-488 interface, and Series 7250 syntax follows SCPI protocol for easy programming. Compass®, an off-the-shelf software package is available in addition to the LabVIEW® driver, a free download and optional MET/CAL® driver. As a standard feature, software written for the previous generation Series 7215, 7010 and 6000 instruments is fully supported by the Series 7250. The Series 7250 can also be set to 510 emulation mode to use software originally written for the DPI 510. Firmware updates can also be performed over the RS-232 interface.

Versatility to handle any pneumatic pressure calibration

The Series 7250 is versatile enough to handle almost any type of pneumatic pressure calibration.

Wide pressure range: available with any full scale pressure between 5 and 2 500 psi (35 kPa and 17.2 MPa) or for higher pressures select the 3 000 psi absolute (21 MPa) range.

Pressure units/scales: Select from over twelve standard units of measure, including inHg at 0 °C and 60 °F, kPa, bar, psi, inH2O at 4 °C, 20 °C and 60 °F, kg/cm2, mmHg at 0 °C, cmHg at 0 °C, and cmH2O at 4 °C, and two user-defined units.

Head pressure: Automatic correction for head pressure differences

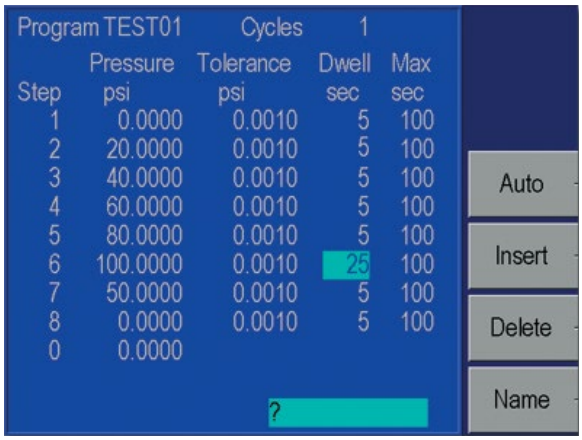
Absolute mode: The 7250i and 7250 offer three different methods to make absolute pressure measurements. The barometric reference option provides the most convenient method and is available on ranges 15 psi (1.0 bar) and higher. Alternatively, the vacuum reference option allows the connection of an external vacuum pump to the reference port of the instrument. An onboard vacuum sensor monitors the reference vacuum and allows for automatic zeroing in absolute mode. This option provides the lowest overall uncertainty since it does not include the additional uncertainty of a secondary barometric reference sensor. For pressure to 50 psia (350 kPa) permanent absolute models are also available. The 7250xi is only available with the barometric reference option for absolute measurement.

Autovent and autozero: With few keystrokes, the Series 7250 will vent the test port to atmosphere or automatically zero itself (autovent is not applicable to permanent absolute models).

Protection of the device under test: Set upper and lower pressure limits to ensure protection of the device under test.



The large color display allows the pressure value to be displayed even when viewing a submenu selection such as the units selection screen shown above.



All Series 7250s are fully programmable and can store up to 20 separate programs with up to 1000 steps.

Options

The Series 7250 can be provided for gauge mode operation, or with:

- Optional vacuum (negative gauge) mode for bidirectional devices
- Optional barometric reference for absolute mode calibrations
- Permanent absolute ranges to 50 psia (350 kPa) full scale which include a tare feature for simulated gauge mode operation

The Series 7250 Pressure Controller/Calibrator can easily automate your test and calibration workload. All are easy to use, easy to maintain, and have the reliability, performance and features that you want. The Series 7250 features an easy-to-navigate menu structure with full text descriptions for menus and commands.

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Specifications

General

Function	7250 Series
Temperature	Operating: 18 °C to 36 °C (64 °F to 96 °F) Storage: -20 °C to 70 °C (-4 °F to 158 °F)
Humidity	5 % to 95 % RH, non-condensing
Weight	Model 7250/7250i: 7.7 kg (17 lb) Model 7250xi: 9 kg (20 lb)
Dimensions (H x W x D)	All versions: 178 mm x 419 mm x 483 mm (7 in x 16.5 in x 19 in)
Pressure medium	Nitrogen or clean dry air
Display	TFT, VGA, active matrix, 162.5 mm (6.4 in) 640 x 480 resolution, 65,000 colors
Test port and supply connection	1/4 in NPT female
Warm up time	24 hours; may be left on indefinitely

Standard pressure ranges

Model 7250xi	Any Full Scale pressure range from 20 psig to 2 500 psig (140 kPa to 17.2 MPa).
Model 7250i	Any Full Scale pressure range from 5 psig to 2 500 psig (35 kPa to 17.2 MPa). Or, Permanent Absolute ranges from 15 psia to 50 psia (100 kPa to 350 kPa absolute).
Model 7250	Any Full Scale pressure range from 5 psig to 2 500 psig (35 kPa to 17.2 MPa). Or, Permanent Absolute ranges from 15 psia to 50 psia (100 kPa to 350 kPa absolute). For ranges below 35 kPa (5 psi), see the 7250LP.
Optional modes	Absolute using barometric reference sensor for ranges from 15 psig to 2 500 psig (100 kPa to 17.2 MPa)
	Vacuum (negative gauge)
	Vacuum reference (requires external vacuum pump)
Model 7250HP	3000 psi absolute (21 MPa absolute)

Performance

Precision [1]	Model 7250xi: From 20 % to 100 % full scale (FS): 0.005 % of reading Below 20 % FS: 0.005% of 20 % FS
	Model 7250i: From 40 % to 100 % FS: 0.005 % of reading Below 40 % FS: 0.005 % of 40 % FS
	Model 7250: Ranges to 2 500 psi (17.2 MPa): 0.003 % of FS
	Model 7250HP: 0.012% of reading or 0.0036% FS, whichever is greater
Stability	Ranges 2 500 psi (17.2 MPa): 0.0075 % of reading per year 3 000 psia (21 MPa) range: 0.005% of reading
Control stability	Active mode: 0.001 % FS (10 ppm) Passive mode: no additional uncertainty
Display resolution	User selectable to 1:1,000,000
Control response	20 seconds or less typical with zero overshoot into a 245 cm (15 in^3) volume for ranges to 2 500 psi (17.2 MPa)
	60 seconds for 3 000 psia (21 MPa) range
Negative gauge precision (optional)	Model 7250xi: 0.005 % of 20 % FS or 0.00075 psi (0.05 kPa), whichever is greater
	Model 7250i: 0.005 % of 40 % FS or 0.0075 psi (0.5 kPa), whichever is greater
	Model 7250: 0.003 % of FS
	Model 7250HP: Not applicable
Negative gauge control stability (optional)	Active mode: 0.001 % FS (10 ppm) Passive mode: no additional uncertainty
Negative gauge control response (optional)	20 seconds or less typical with zero overshoot into a 245 cm (15 in^3) volume for ranges to 2 500 psi (17.2 MPa)
	60 seconds for 3 000 psia (21 MPa) range
Barometric reference (optional)	0.002 psi (0.014 kPa) maximum error per year
Vacuum reference (optional)	0.0002 psi (0.0014 kPa) maximum error per year (Only available on 7250i and 7250)

Calibration

An accredited calibration report is provided standard. For information on the calibration uncertainty, please see the appropriate Fluke Calibration Scope of Accreditation.

Total Uncertainty (k=2)2

Model 7250xi	20 % to 100 % FS 90 day: 0.006 % reading 1 year: 0.009 % reading
Model 7250i	40 % to 100 % FS 90 day: 0.006 % reading 1 year:0.009 % reading
Model 7250	90 day: 0.003 % FS + 0.002 % reading 1 year: 0.003 % FS + 0.0075 % reading
Model 7250HP	30 % to 100 % FS 90 day: 0.012% reading 1 year: 0.013% reading

Control parameters

Volume	82 cm to 980 cm (5 in^3 to 60 in^3)
Low Control (absolute)	0.15 psia (1 kPa)

Communications

RS-232 and IEEE-488, SCPI syntax. Series 7215, Model 7010, Series 6000 and DPI 510 emulation are standard.

MET/CAL® driver	Optional
LabView® driver	Optional

Firmware updates are performed via RS-232 interface

Languages

The Series 7050 is capable of displaying menus and functions in: English, French, Chinese, German, Japanese, Spanish and Italian

Options

Barometric reference (absolute and vacuum)
Vacuum mode (negative gauge)
Vacuum reference (requires external vacuum pump)

Accessories

3911197	Transportation Case with Wheels and Handles
3879677	Rack mount kit for 19 in. EIA cabinets, 24 in. deep
3879689	Rack mount kit for 19 in. EIA cabinets, 30 in. deep
3876298	Lines and Fittings Kit
4014713	Vacuum Pump with auto-vent, 85 liters/minute
3876271	Liquid Trap
3891089	MET/CAL Pseudo-Driver
3070175	COMPASS for Pressure Enhanced, Single License

Model 7250i	Uncertainty (2 sigma)
Precision	0.005 % of reading
Stability (one year)	0.0075 % of reading
Calibration standard	0.0010 % of reading
Environmental temperature (included in precision)	0.000 % of reading
Head pressure	0.001 % of reading
Expanded uncertainty (2 sigma)	0.009 % of reading

[1] Precision is defined as the combined effects of linearity, repeatability and hysteresis throughout the operating temperature range.

[2] Total uncertainty is the maximum deviation from the true value of pressure including precision, stability, temperature effects and the calibration standard. This assumes routine zeroing of the instrument. Expression of uncertainty conforms with the recommendations of the ISO Guide to the Expression of Uncertainty in Measurement.

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