FLUKE®

Calibration

2271A Industrial Pressure Calibrator

Technical Data

The complete pneumatic pressure calibrator that grows along with your workload for wide workload coverage now and in the future

The Fluke Calibration 2271A Industrial Pressure Calibrator provides a complete, automated solution for calibrating a wide variety of pressure gauges and sensors. Thanks to its modular design, it can be configured to meet different needs and budgets, and expanded to cover a broad workload.

The 2271A is ideal for calibration laboratories starting out in pressure calibration because it offers wide pressure measurement capabilities in a single instrument. Everything you need for calibrating pressure is included; just connect supply pressure. And your investment will stand the test of time: as your workload grows and changes, the 2271A can grow and change too. Just add measurement modules.

The 2271A is also a great fit for labs that currently calibrate pressure transmitters and gauges and want to expand their capabilities or make their processes more efficient. This instrument is easy to set up and use, so you don't have to reserve it for your most experienced technicians. And it can be fully automated so it can help your lab run more efficiently.

If you are concerned about contamination from workload coming in from the field, the 2271A is a good choice for you as well. Its optional Contamination Prevention System (CPS) provides an important safeguard against that pervasive hazard.

A graphical user interface in your choice of ten languages and an intuitive menu structure, as well as an intuitive hardware design, make the 2271A remarkably easy to learn and to use.

2271A features at a glance

- Calibrate a wide range of gauges and sensors with a single instrument
- Wide measurement range from –100 kPa to 20 MPa (–15 psi to 3000 psi)
- Removable pressure measurement modules make it easy to change or add measurement ranges
- Integrated electrical measurement module provides a complete solution for calibrating pressure transmitters
- Built-in dual test ports enable you to connect multiple devices under test (DUTs)
- 0.02 % FS pressure measurement uncertainty
- Localized graphical user interface in choice of ten languages

1. These external drivers are 24 V dc outputs that operate accessories such as the Contamination Prevention System
2. USB port
3. Ethernet connector
4. RS-232 connector
5. Master on/off switch
6. Line power fuse AC PWR INPUT Connector
7. All of the pressure connections are made on the rear panel through this replaceable manifold
8. Graphical user interface in choice of ten languages features an easy-to-read, intuitive menu structure that lets you access any feature within four button presses or less
9. The large main display enables you to easily view and edit important information
10. Real time graph makes it easy to see pressure stability or procedure status
11. Function softkeys
12. Push the Setpoint button to quickly enter a pressure value to control
13. Pressure measurement modules snap in and out easily
14. Test ports provide easy, hand-tight connection to devices under test
15. Reference port for applications that require an atmospheric reference
16. Handle
17. Make minor adjustments to the pressure using the jog wheel; ideal for calibration of analog dial gauges

Wide workload coverage for the present and the future

The 2271A features pressure ranges from –100 kPa to 20 MPa (–15 psi to 3000 psi), which covers the requirements of a wide range of gauges and sensors. Thanks to its modular design, the 2271A enables you to install two modules with different measurement ranges within the same chassis. You can purchase modules to match your current workload now; later, when your workload changes and grows, you can easily add ranges. This flexibility enables you to maintain your investment in the 2271A for years to come.

A built-in electrical measurement module (EMM) with HART capabilities enables you to perform closed loop, fully automated calibration on 4–20 mA devices such as smart transmitters, gauges and switches. Just set up the 2271A and then walk away to attend to other tasks.

The EMM supplies 24 V dc loop power for measuring mA and V dc. It has a built-in 250 Ohm resistor that can be toggled on or off, eliminating the need to have an external resistor to enable HART communications.

The 2271A accuracy specifications are provided in full and supported by a technical note that details its measurement uncertainty so you know exactly what you are getting. This technical note is available for download on the flukecal.com website. As with all Fluke Calibration instruments, these specifications are conservative, complete and dependable.

Install up to two pressure modules in the 2271A chassis at one time.

Use the 2271A to perform closed loop, fully automated calibration on 4–20 mA devices like this transmitter.

Versatile pressure measurement modules

The 2271A uses PM200 Pressure Measurement Modules. These modules use a highly characterized silicon pressure sensor to provide an economical method of making accurate pressure measurements. The 0.02 % full scale (FS) specification includes the short-term performance of the module (linearity, hysteresis and repeatability) as well as its long-term stability and the uncertainty of the calibration standard. Users can be confident in the PM200 measurement performance.

Install up to two pressure modules in the 2271A chassis at one time, mixing and matching module ranges to get the combination that best suits your needs. There is no limit to the number of modules that can be used with the system, allowing you to change pressure ranges on the fly to meet your needs. Modules snap in and out quickly and easily through the front of the 2271A; just slide each into a specially-designed track and tighten the knob until you hear it click into place. The click tells you the module is safely in place; a special anti-torque guard on the knob prevents over-tightening so you never have to wonder if you tightened it too much or not enough.

Each module uses an enhanced face-seal design that has been leak tested to pressures three times higher than the maximum working pressure. You don't have to worry about a leak in the system affecting your ability to measure and control pressure.

Dual test ports on top of the 2271A let you easily mount two devices under test.

Conveniently located dual test ports and reference port

Dual test ports on the top of the 2271A let you easily mount two devices under test (DUTs). You can potentially double your throughput without spending time searching for fittings and tees. The vertical test ports let you easily connect analog dial gauges without the need for additional test stands or manifolds. Two test port types are supported, the standard HC20 or the P3000 test port. Both types of test ports enable you to make hand tight connections to traditional NPT, BSP, or metric pressure fittings. The HC20 test port includes easy grip features and integral support for M20 connections, whereas the P3000 style test port provides backwards compatibility for users of Fluke Calibration P3000 deadweight testers or P5500 pressure comparators.

A reference port is also located on top of the 2271A for applications that require an atmospheric reference.

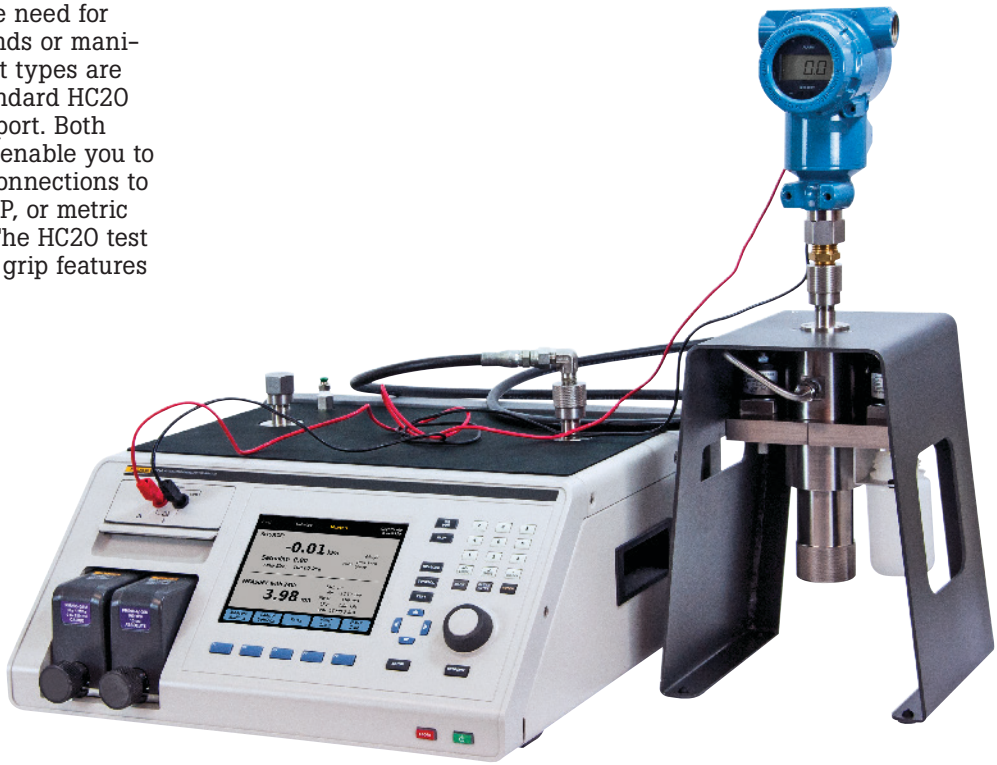
Safety features protect operators and instruments

Each measurement module, as well as the main chassis, has pressure relief valves to protect the instrument and its operators from accidental overpressure. The 2271A has been designed using Sound Engineering Practices (SEP). With the internal relief valves, user-settable pressure limits, and emergency abort button, safety is the highest priority.

Preventing contamination

If your workload includes devices that contain different substances like water, oil and gas, you could be at risk for contamination—something getting into your system that isn't supposed to be there. Contamination can clog a calibrator's valves, wear out its parts, and make it difficult to maintain pressure. If the contamination gets into the sensor, it can actually change the calibrator's behavior and throw off your readings. If contamination is a concern to you, order the optional Contamination Prevention System (CPS) to help keep the calibrator's valves clean and free from debris.

The CPS provides an unprecedented level of protection by maintaining uni-directional flow away from the controller, a gravity sump system, and a two-stage filtering system.



The Contamination Prevention System helps keep the valves on the 2271A clean and free from debris.

Automation, support and training

Automate with COMPASS® software for improved consistency and throughput

Fluke Calibration COMPASS for Pressure software is designed specifically for pressure calibration. It enables you to automate the 2271A and run complete pressure calibration sequences on single or multiple devices under test. COMPASS software removes the unknowns often associated with getting automated systems online. The 2271A also features a full remote interface that enables you to use it with custom software or other data acquisition equipment. Details about the interface are provided in the 2271A User Manual.

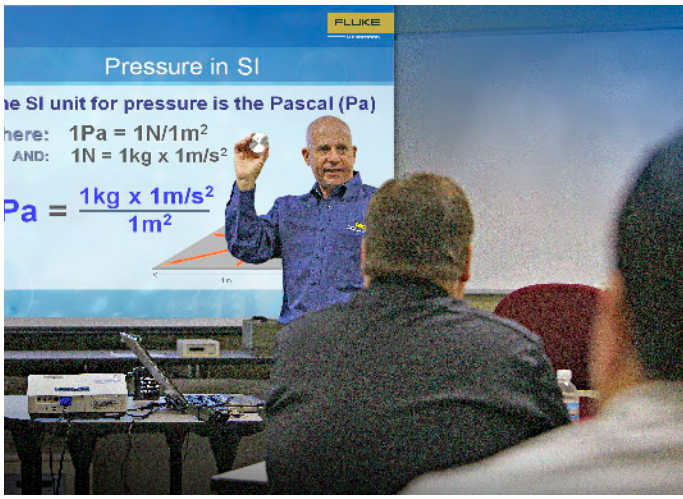
CarePlans help you manage cost of ownership

Reduce downtime and control your cost of ownership with a CarePlan. Fluke Calibration offers one-year, three-year and five-year Priority Gold CarePlans, which feature an annual standard or accredited calibration of your 6270A calibrator with guaranteed six-day in-house turnaround, plus free repairs with guaranteed ten-day in-house repair (includes calibration). One-year, three-year, and five-year Silver CarePlans are available for those customers who only want extended warranty coverage.

Gold CarePlans	Silver CarePlans
Annual calibration	Extended warranty coverage beyond original factory warranty
Free repairs with guaranteed turnaround time	Calibration included on repair
Pre-paid priority freight on return of instrument	Free product updates performed at time of repair
Free product updates	Discounts on regular calibrations and out-of-plan service charges
Discounts on product upgrades	
Discounts on training	

A range of training options gets you up and running quickly

We sponsor pressure and flow calibration courses in our Phoenix, Arizona facility in the United States. We also host periodic web seminars at no charge on a wide variety of pressure calibration topics. If you need service or maintenance training to help you maintain your fleet of pressure controllers, we can help you there, too.



We sponsor pressure and flow calibration courses in our Phoenix, Arizona facility.

We're here to help

Fluke Calibration's testing, repair and calibration services are dedicated to filling your needs quickly and at a fair cost while maintaining the unmatched level of quality that is our trademark. Our pressure calibration laboratories are accredited by the American Association for Laboratory Accreditation (A2LA) for conformance to ISO Guide 17025. We maintain global calibration and repair facilities to help you keep your hardware in top working order.

Summary specifications

General specifications	
Power requirements	0 V ac to 240 V ac, 47 Hz to 63 Hz
Fuse	T2A 250 V ac
Max power consumption	100 W
Operating ambient temperature range	15 °C to 35 °C
Storage temperature	-20 °C to 70 °C
Relative humidity	Operating: <80 % to 30 °C, <70 % to 35 °C
	Storage: <95 %, non-condensing. A power stabilization period of four days may be required after extended storage at high temperature and humidity.
Vibration	MIL-T-28800D CLASS 3
Altitude (Operation)	<2000 m
Ingress protection	IEC 60529: IP20
Safety	IEC 61010-1, Installation Category II, Pollution degree 2
Warmup time	15 minutes typical
Weight (chassis only)	15 kg (33.06 lbs)
Dimensions	Height: 2271A-NPT-HC20 305 mm (12 in)
	Height: 2271A-BSP-HC20 305 mm (12 in)
	Height: 2271A-NPT-P3K 237 mm (9.33 in)
	Height: 2271A-BSP-P3K 237 mm (9.33 in)
	Width: 442 mm (17.40 in)
	Depth: 446 mm (17.55 in)

Control specifications		
Control Precision (Dynamic Mode)	PM200-BG2.5K	0.005% Range Span
	All other ranges	0.001 % Range Span
Control turndown	10:1 (Typical)	
Low control point	1 kPa (0.15 psi) absolute	
Control turndown is defined as the relationship between the provided supply pressure and the appropriate supply pressure for the range. For example, a unit with a 7 MPa (1000 psi) and 700 kPa range (100 psi) with a supply pressure of 7.7 MPa (1100 psi) provides control precision of 0.001 % range because 7 MPa is 10 times greater than 700 kPa. A system with ranges of 20 MPa (3000 psi) and 700 kPa (100 psi) with supply pressure of 22 MPa (3300 psi) will have 0.001 % range control precision on the 20 MPa range but only 0.003 % control precision on the 700 kPa range. Control precision of 0.001 % on the low range can be achieved by reducing the supply pressure.		

Supply pressure requirements

Clean dry air or nitrogen (industrial grade, 99.5 %)

Maximum particulate contamination	≤ 1.25 micrometer (50 microinches)
Maximum moisture content	-50 °C dew point
Maximum hydrocarbon content	30 ppm

Interface / communications

Primary remote interfaces	Ethernet, RS-232, USB
Electrical Measurement Module (EMM)	
Connection	Standard 4 mm jack
	Maximum 30 V dc w.r.t. chassis ground
Aux drivers	4 external solenoid drivers
	24 V dc. 100 % duty cycle when turned, reducing to 40 % shortly after.

Pressure measurement specifications

PM200 Modules				
Model	**Range (SI units)**	**Range (Imperial units)**	**Measurement mode**	**1 year specification (%FS)**
PM200-BG2.5K	-2.5 kPa to 2.5 kPa	-10 in$H_2$0 to 10 in$H_2$0	gauge	0.20 %
PM200-BG35K	-35 kPa to 35 kPa	-5 psi to 5 psi	gauge	0.05 %
PM200-BG40K	-40 kPa to 40 kPa	-6 psi to 6 psi	gauge	0.05 %
PM200-BG60K	-60 kPa to 60 kPa	-9 psi to 9 psi	gauge	0.05 %
PM200-A100K	2 kPa to 100 kPa	0.3 psi to 15 psi	absolute	0.10 %
PM200-BG100K	-100 kPa to 100 kPa	-15 psi to 15 psi	gauge	0.02 %
PM200-A200K	2 kPa to 200 kPa	0.3 psi to 30 psi	absolute	0.10 %
PM200-BG200K	-100 kPa to 200 kPa	-15 psi to 30 psi	gauge	0.02 %
PM200-BG250K	-100 kPa to 250 kPa	-15 psi to 36 psi	gauge	0.02 %
PM200-G400K	0 kPa to 400 kPa	0 psi to 60 psi	gauge	0.02 %
PM200-G700K	0 kPa to 700 kPa	0 psi to 100 psi	gauge	0.02 %
PM200-G1M	0 MPa to 1 MPa	0 psi to 150 psi	gauge	0.02 %
PM200-G1.4M	0 MPa to 1.4 MPa	0 psi to 200 psi	gauge	0.02 %
PM200-G2M	0 MPa to 2 MPa	0 psi to 300 psi	gauge	0.02 %
PM200-G2.5M	0 MPa to 2.5 MPa	0 psi to 360 psi	gauge	0.02 %
PM200-G3.5M	0 MPa to 3.5 MPa	0 psi to 500 psi	gauge	0.02 %
PM200-G4M	0 MPa to 4 MPa	0 psi to 580 psi	gauge	0.02 %
PM200-G7M	0 MPa to 7 MPa	0 psi to 1000 psi	gauge	0.02 %
PM200-G10M	0 MPa to 10 MPa	0 psi to 1500 psi	gauge	0.02 %
PM200-G14M	0 MPa to 14 MPa	0 psi to 2000 psi	gauge	0.02 %
PM200-G20M	0 MPa to 20 MPa	0 psi to 3000 psi	gauge	0.02 %

Notes

- Gauge mode modules (PM200-GXXX or PM200-BGXXX) with ranges of 100 kPa (15 psi) or greater will support absolute mode measurement when used with a Barometric Reference Module.
- For temperatures from 15 °C to 18 °C and 28 °C to 35 °C, add 0.003 % FS/°C.
- Uncertainty for gauge mode modules assumes routine zeroing. Uncertainty for absolute-mode modules includes 1-year zero stability. This specification can be reduced to 0.05 % FS if the PM200 module is zeroed on a continuing basis to remove the 1-year zero stability component.
- Instrumental measurement uncertainty for gauge mode modules used in absolute mode by addition of a barometric reference module is calculated as the uncertainty of the gauge mode module plus the uncertainty of the Barometric Reference Module.

Ordering information

Models	Description
2271A-NPT-HC20	Industrial Pressure Calibrator Chassis, NPT Manifold, HC20 Test Port Connections
2271A-NPT-P3K	Industrial Pressure Calibrator Chassis, NPT Manifold, P3000 Test Port Connections
2271A-BSP-HC20	Industrial Pressure Calibrator Chassis, BSP Manifold, HC20 Test Port Connections
2271A-BSP-P3K	Industrial Pressure Calibrator Chassis, BSP Manifold, P3000 Test Port Connections

Pressure modules
Please refer to the summary specifications for details about the pressure measurement modules.

Accessories

CASE-2271	Shipping Case, 2271A
CASE-PMM	Shipping Case, 3 PMM Modules
PK-2271-NPT-HC20	Lines and Fittings Kit, 2271A-NPT-HC20
PK-2271-NPT-P3K	Lines and Fittings Kit, 2271A-NPT-P3K
PK-2271-BSP-HC20	Lines and Fittings Kit, 2271A-BSP-HC20
PK-2271-BSP-P3K	Lines and Fittings Kit, 2271A-BSP-P3K
PMM-CAL-KIT-20M	Pressure Module Calibration Kit, 20 MPa (3000 psi)
VA-PPC/MPC-REF-110	Vacuum Pump Package, 110 V
VA-PPC/MPC-REF-220	Vacuum Pump Package, 220 V

The broadest range of calibration solutions
Fluke Calibration provides the broadest range of calibrators and standards, software, service, support and training in electrical, temperature, pressure, RF and flow calibration.

Visit **www.flukecal.com** for more information about Fluke Calibration products and services.

The Contamination Prevention System acts as a test stand for connecting units under test, as well as for preventing contamination from reaching the 2271A.

Fluke Calibration. *Precision, performance, confidence.*™

Electrical | RF | Temperature | Pressure | Flow | Software

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