

**FLUKE®**

**Calibration**



**2271A Industrial  
Pressure Calibrator**  
Extended specifications

# Specifications

## General Specifications

Power Requirements .....	100 V ac to 240 V ac, 47 Hz to 63 Hz
Fuse.....	T2A 250 V ac
Max Power Consumption.....	100 W
<b>Operating Ambient</b>	
Temperature Range .....	15 °C to 35 °C
Storage Temperature .....	-20 °C to 70 °C
<b>Relative Humidity</b>	
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

## Electromagnetic Compatibility (EMC)

International .....	IEC 61326-1: Controlled Electromagnetic Environment CISPR 11: Group 1, Class A <i>Group 1: Equipment has intentionally generated and/or uses conductively-coupled radio frequency energy that is necessary for the internal function of the equipment itself.</i> <i>Class A: Equipment is suitable for use in all establishments other than domestic and those directly connected to a low-voltage power supply network that supplies buildings used for domestic purposes. There may be potential difficulties in ensuring electromagnetic compatibility in other environments due to conducted and radiated disturbances. Emissions that exceed the levels required by CISPR 11 can occur when the equipment is connected to a test object.</i>
Korea (KCC) .....	Class A Equipment (Industrial Broadcasting & Communication Equipment) <i>Class A: Equipment meets requirements for industrial electromagnetic wave equipment and the seller or user should take notice of it. This equipment is intended for use in business environments and not to be used in homes.</i>
USA (FCC) .....	47 CFR 15 subpart B. This product is considered an exempt device per clause 15.103.

## Weight

Chassis only .....	15 kg (33.06 lbs)
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## Dimensions

Height .....	2271A-NPT-HC20	305 mm (12 in)
	2271A-BSP-HC20	305 mm (12 in)
	2271A-NPT-P3K	237 mm (9.33 in)
	2271A-BSP-P3K	237 mm (9.33 in)
Width .....	442 mm (17.40 in)	
Depth.....	446 mm (17.55 in)	

**Pressure Limits**

Working Pressure Range .....	-97.90 kPa (-14.2 psi) gauge to 20 MPa (3000 psi) gauge
Supply Port .....	23 MPa (3300 psi) gauge
Test Port .....	20 MPa (3000 psi) absolute
Reference Port .....	115 kPa (17 psi) absolute
Vent Port .....	150 kPa (22 psi) absolute

**Relief Valves**

- Chassis Supply port relief valve is set to 24.1 MPa (-0/+700 kPa), 3500 psi (-0/+100 psi)
- Exhaust port relief valve is set to ~830 kPa (120 psi).
- Each Pressure Measurement Module (PMM) includes a module-specific pressure protection device.

**Supply Gas Type**

- 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

**Vacuum Supply**

- >50 liters per minute capacity with Auto Vent feature
- Exhaust gas will pass through the vacuum supply. Appropriate protections should be taken when operating at higher pressures.

**Interface / Communications**

- Primary remote Interfaces ..... Ethernet, RS232, USB
- Electrical Measurement Module (EMM)
- Connection..... Banana 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 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)

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.

Low Control Point ..... 1 kPa (0.15 psi) absolute

**Time to Setpoint (Typical)**

- PM200-BG2.5K..... 40 seconds
- All other Ranges ..... 20 seconds

Typical set time is the time required to be within 0.005 % of the setpoint for 10 % steps into volumes of 0 to 50 cm<sup>3</sup> and pressures above 50 kPa (7.25 psi) absolute. Lower absolute pressures requires longer set times depending upon quality of the vacuum pump, diameter and material of tubing used, and test volume.

Maximum Overshoot..... 0.02 % Range Span

# Pressure Measurement Specifications

The Product specifications describe the absolute instrumental uncertainty for the Product. The Product specifications include linearity, hysteresis, repeatability, resolution, reference uncertainty, 1-year stability and temperature effects from 18 °C to 28 °C. The Product specifications are provided at a 95 % level of confidence, k=2, normally distributed.

## 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 inH <sub>2</sub> O to 10 inH <sub>2</sub> O	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.

# Electrical Specifications

The Product specifications describe the absolute instrumental uncertainty for the Product. The Product specifications include linearity, hysteresis, repeatability, resolution, reference uncertainty, 1-year stability and temperature effects from 18 °C to 28 °C. The Product specifications are provided at a 99 % level of confidence, k=2.58, normally distributed.

## EM300 Electrical Measurement Specifications

DC Voltage		
Range <sup>[2]</sup>	Resolution	1 Year Specification <sup>[1]</sup>
30 V	1 mV	0.01 % of RDG + 2 mV
DC Current		
Range <sup>[2]</sup>	Resolution	1 Year Specification <sup>[1]</sup>
24 mA	1 µA	0.01 % of RDG + 2 µA
1. Temperature coefficient adder for temperatures outside 23 ±5 °C: 20 ppm of Full Scale / °C. 2. All outputs are positive only.		

### Source

Loop Compliance Voltage ..... ≥24 V dc @ 20 mA (without 250 Ω built in resistor)  
 ≥19 V dc @ 20 mA (with 250 Ω built in resistor)

### Switch Testing

Current Limits ..... ≤4 mA  
 Conditions..... Closed >1.5 mA, Open <0.5 mA

### HART Communication and Functions

HART Modes..... HART mA measurement with 24 V (Loop)  
 Automatic HART Detection..... HART connected with automatic polling  
 HART Selectable Resistor ..... Built-in 250 Ω loop resistor. Selectable ON/OFF  
 HART Commands ..... HART universal and common practice commands (no device specific commands)  
 Write Protection..... HART Write enable/disable

## Ordering information

### Models

### Description

<b>2271A-NPT-HC20</b>	Industrial Pressure Calibrator Chassis, NPT Manifold, HC20 Test Port Connections
<b>2271A-NPT-P3K</b>	Industrial Pressure Calibrator Chassis, NPT Manifold, P3000 Test Port Connections
<b>2271A-BSP-HC20</b>	Industrial Pressure Calibrator Chassis, BSP Manifold, HC20 Test Port Connections
<b>2271A-BSP-P3K</b>	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

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

## Fluke Calibration.

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**Fluke Calibration**  
PO Box 9090, Everett, WA 98206 U.S.A.

**Fluke Europe B.V.**  
PO Box 1186, 5602 BD  
Eindhoven, The Netherlands

**For more information call:**  
In the U.S.A. (877) 355-3225 or  
Fax (425) 446-5116  
In Europe/M-East/Africa +31 (0) 40 2675 200 or  
Fax +31 (0) 40 2675 222  
In Canada (800)-36-FLUKE or  
Fax (905) 890-6866  
From other countries +1 (425) 446-5500 or  
Fax +1 (425) 446-5116  
Web access: <http://www.flukecal.com>

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