

PG7202™

High Pressure Gas Piston Gauge

Technical Data

from 100 kPa to 110 MPa (15 to 16 000 psi)

PG7202 is a member of the PG7000 family of reference level piston gauges that covers the range of high pressure gas up to 110 MPa (16 000 psi). Operating directly in gas avoids difficult to use liquid/gas separators that add uncertainty to the measurement process. PG7202's gas operated, liquid lubricated piston-cylinder design overcomes the disadvantages of lubricating the piston-cylinder with gas at high pressure. Performance is not affected by gas cleanliness and piston drop rates are even lower than those typically found in hydraulic piston gauges.

PG7202 is combined with the GPC1 gas pressure controller to configure a complete manually operated calibration system with effort free gas pressure setting and adjusting (see GPC1 brochure). By substituting a PPCH-G automated pressure controller for GPC1 and adding on AMH-100 automated mass handler, PG7202 operation can be fully automated.

Gas operated, liquid lubricated piston-cylinder

The principle of operation of the PG7202 piston-cylinder is simple but very effective. The measured gas pressure, P_g , is applied to the bottom of the piston and to the top of a liquid reservoir located around the cylinder. The reservoir is connected to the gap between the piston and the cylinder through lateral holes in the cylinder, allowing liquid from the reservoir to enter the gap.



The pressure of the liquid in the gap, P_l , is equal to the gas pressure, P_g , plus the pressure resulting from the liquid head, h . Therefore, regardless of the gas pressure value, the liquid pressure in the gap is always higher than the gas pressure by the amount of the liquid head. Since h is small and the space between the piston and cylinder is typically less than 1 micron, the bleed of liquid from the bottom of the cylinder towards the gas pressure is minute. By design, any liquid accumulation drops directly into a deadended sump. No significant contamination of the test system occurs. As the liquid reservoir is contained in the piston-cylinder module, the piston-cylinder can be removed and installed in the PG7202 piston gauge platform with no loss of liquid from the reservoir.

All PG7202 piston-cylinder modules can be delivered using Krytox®, a fluorinated synthetic oil, to lubricate the piston-cylinder for applications in which the system must be free of hydrocarbons.

Differential pressure at elevated line pressure

Two PG7202s can be used in combination to define low differential pressures at elevated line pressures. Contact DHI for more information.

Hydraulic operation

The PG7202 platform can also be operated using oil as the pressurized medium in the range of 1 to 200 MPa (145 to 30 000 psi). To operate with oil, piston-cylinder modules PC-7300-1, -2, or -5 are used (see PG7000 brochure). A simple 10 minute switch over procedure, detailed in the product manual, is all that is needed to switch between pneumatic and hydraulic operation.

Upgrades of type 5200 piston gauges

DHI or Desgrange et Huot Type 5200 and 5500 piston gauges can be upgraded to PG7202 system by installing the piston-cylinders in new PG7202 modules. See the data sheet "Piston Gauge Upgrades, 5000 to 7000" for additional information.

Note: This brochure provides information specific to the PG7202 model of the PG7000 family of piston gauges. See the PG7000 Reference Level Pressure Standards catalog for complete PG7000 information.

Liquid lubricated, gas operated piston-cylinder modules and mass sets

Ranges

Designator	Pressure to mass [p/kg]	Minimum pressure ¹				Maximum pressure											
		Piston only		Piston and bell		35 KG		40 KG		45 KG		55 KG		80 KG		100 KG	
		MPa	psi	MPa	psi	MPa	psi	MPa	psi	MPa	psi	MPa	psi	MPa	psi	MPa	psi
PC-7200-100	100 kPa	0.02	3	0.1	15	3.5	500	4.0	600	4.5	650	5.5	800	8.0	1 150	10.0	1 450
PC-7200-200	200 kPa	0.04	5	0.2	30	7.0	1 000	8.0	1 200	9.0	1 300	11.0	1 600	16.0	2 300	20.0	2 900
PC-7200-500	500 kPa	0.10	15	0.5	75	17.5	2 500	20.0	3 000	22.5	3 300	27.5	4 000	40.0	5 800	50.0	7 250
PC-7200-1	1 MPa	0.20	30	1.0	150	35.0	5 000	40.0	5 900	45.0	6 500	55.0	8 000	80.0	11 750	100.0	14 500
PC-7200-2	2 MPa	0.40	60	2.0	300	70.0	10 000	80.0	11 900	90.0	13 000	110.0	16 000	110.0 ²	16 000 ²	110.0 ²	16 000 ²

¹ The minimum pressure point is defined by floating the piston only. Piston mass is 200 g (7 oz).

² Full mass set cannot be loaded, maximum limited by maximum working pressure of PG7202 platform.

Specifications

Designator	Nominal area	Typical drop rate	Measurement uncertainty in pressure
PC-7200-100	98.1 mm ² (0.16 in ²)	0.10 mm/min	± (2 Pa + 20 ppm)
PC-7200-200	49.0 mm ² (0.076 in ²)	0.15 mm/min	± (3 Pa + 20 ppm)
PC-7200-500	19.6 mm ² (0.03 in ²)	0.20 mm/min	± (7 Pa + 18 ppm + 0.15 ppm/MPa)
PC-7200-1	9.8 mm ² (0.015 in ²)	0.25 mm/min	± (15 Pa + 20 ppm + 0.15 ppm/MPa)
PC-7200-2	4.9 mm ² (0.008 in ²)	0.50 mm/min	± (30 Pa + 30 ppm + 0.15 ppm/MPa)

All general specifications are identical to other PG7000 piston gauge models. Please refer to the PG7000 product literature. All pistons and cylinders are made of tungsten carbide.

Ordering information

Model

PG7202 Gas operated piston gauge
PG7202 Gas operated piston gauge, with motorized piston rotation

Piston-cylinder modules

PC-7200-100 Gas P-C module
PC-7200-200 Gas P-C module
PC-7200-500 Gas P-C module
PC-7200-1 Gas P-C module
PC-7200-2 Gas P-C module

Mass sets

Please refer to the PG7000 Piston Gauges brochure.

Accessories

To configure a complete PG7202 system, a means of setting and adjusting high gas pressure must be included. MPC1-3000 performs this function up to 20 MPa (3 000 psi). GPC1-16000 is used for pressure up to 110 MPa (16 000 psi). A gas booster is used to supply the pressure controller with high pressure by boosting pressure from a standard gas cylinder. See the MPC1 and GPC1 brochures for additional information.

MPC1-3000 Manual pressure controller
GPC1-16000 Gas pressure controller
Booster, gas 75:1, with control kit
Booster, gas 152:1, with control kit

Contact Fluke Calibration for information on configuring a hydrocarbon free PG7202 system for dedicated use in hydrocarbon free calibration systems.

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Fluke Calibration

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