PG7202™ PLATFORM

High Pressure Gas Piston Gauge

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

DESCRIPTION /APPLICATIONS

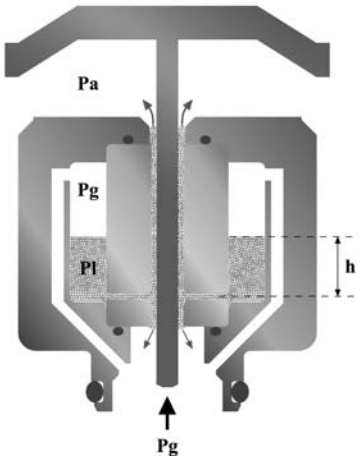
PG7202 is a member of the PG7000 family of reference level piston gauges that covers the range of high pressure gas up to 110 MPa (16 000 psi). Operating directly in gas avoids difficult to use liquid/gas separators that add uncertainty to the measurement process. PG7202's new, gas operated, liquid lubricated 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 calibration system with effort free gas pressure setting and adjusting (see GPC1 brochure).

GAS OPERATED, LIQUID LUBRICATED PISTON-CYLINDER

The principle of operation of the PG7202 piston-cylinder is simple but very effective. The measured gas pressure, **Pg**, 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, **Pl**, is equal to the gas pressure, **Pg**, 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.

Though liquid may migrate through the gas at the molecular level, 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.



Pg = measured gas pressure **Pl = Pg + ρlgh**
Pl = liquid pressure **Pl > Pg**
Pa = atmospheric pressure

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 (e.g. when calibrating instrumentation for oxygen service).

HIGH LINE, DIFFERENTIAL PRESSURE

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

UPGRADES OF TYPE 5200 PISTON GAUGES

DH Instruments 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 and using the existing Type 5000 masses. See the data sheet "Piston Gauge Upgrades, 5000 to 7000" for additional information.

DHI®

Calibration Solutions for Pressure and Flow™

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.

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LIQUID LUBRICATED, GAS OPERATED PISTON-CYLINDER MODULES AND MASS SETS

Ranges

DESIGNATOR	PRESSURE TO MASS [p/kg]	MINIMUM PRESSURE*				MAXIMUM PRESSURE											
		Piston Only		Piston & 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†	16 000†	110.0†	16 000†

* The minimum pressure point is defined by floating the piston only. Piston mass is 200 g.

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

SPECIFICATIONS

All general specifications are identical to other PG7000 piston gauge models (see the PG7000 Piston Gauges catalog).

Piston-Cylinder Module Specifications

MODULE	NOMINAL AREA [mm^2]	TYPICAL DROP RATE [mm/min]	MEASUREMENT UNCERTAINTY IN PRESSURE
PC-7200-100	98.1	0.10	± (2 Pa + 20 ppm)
PC-7200-200	49.0	0.15	± (3 Pa + 20 ppm)
PC-7200-500	19.6	0.20	± (7 Pa + 20 ppm + 0.15 ppm/MPa)
PC-7200-1	9.8	0.25	± (10 Pa + 25 ppm + 0.15 ppm/MPa)
PC-7200-2	4.9	0.50	± (20 Pa + 35 ppm + 0.15 ppm/MPa)

All pistons and cylinders are made of tungsten carbide.

ORDERING INFORMATION

Platform

Designator	Part No.	Description
PG7202	401297	Gas operated piston gauge
PG7202	401298	Gas operated piston gauge, with motorized piston rotation

Piston-Cylinder Modules

Designator	Part No.	Description
PC-7200-100	401738	Gas P-C module
PC-7200-200	401739	Gas P-C module
PC-7200-500	401740	Gas P-C module
PC-7200-1	401741	Gas P-C module
PC-7200-2	401742	Gas P-C module

Mass Sets

See page 16 of the PG7000 Piston Gauges catalog.

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.

Designator	Part No.	Description
MPC1-3000	401210	Manual pressure controller
GPC1-16000	401800	Gas pressure controller
Booster, gas	401002	75:1, with control kit
Booster, gas	400509	152:1, with control kit

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

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