2492

MODEL 2492

Automatic hydraulic piston gauge system

- Pressure ranges from 2 to 2750 bar
- Fully automatic operation
- Local or remote (host PC) operation
- Accuracy to 35 ppm
- Precision better than 6 ppm
- Resolution to 1 ppm

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Automatic hydraulic piston gauge system

The Model 2492 Automatic Hydraulic Piston Gauge system combines the accuracy and precison of Ruska primary pressure standards with a fully automated system for laboratory and high-volume manufacturing environments. Using a self-recharging pump, the Model 2492 provides continuous automatic operation and allows generation of pressures from 2 to 2750 bar. The Model 2492's automatic, continuous operation increases the number of calibrations, resulting in increased productivity and higher throughput.

Automatic Operation

The Model 2492 provides totally automated operation. No more manually lifting masses or performing calculations—the Model 2492 handles it all. The microprocessor calculates the masses required to generate the requested pressure and automatically corrects for environmental factors such as local gravity, air density, head pressure, and temperature. The automated mass loading system selects and loads the correct amount of mass needed to generate the desired pressure.

Once the masses are loaded, the self-recharging pump pressurises the system to float the masses. When the masses reach the proper float position, the pump is turned off to ensure that a static pressure condition is met. The float position indicator (FPI) and resistance temperature device (RTD) evaluate float position, sink rate, and temperature in determining a valid float condition. When conditions are met, the system signals the user (or host PC if remote operation is being used) and the balance is maintained until a new command is entered. Pressure values are entered either locally by the operator using a keyboard, or remotely using a computer and IEEE-488 interface. In remote mode, the Model 2492 can automatically generate up to 160 discrete pressure points per piston/cylinder.

Piston/Cylinder Assemblies

Three piston/cylinder assemblies are available to best match your application.

- Low range piston: 2 to 275 bar
- Mid range piston: 8.6 to 1380 bar
- High range piston: 17 to 2750 bar

The piston/cylinder assemblies can be changed in less than 30 minutes. Systems can be ordered with only one or all three piston/cylinder assemblies.

The Model 2492 includes a sophisticated microprocessor-based control computer and other electronics. The color monitor and PC-compatible keyboard are included. PC control via IEEE-488 interface for remote operation is an option.

Optional IEEE-488 communication allows a remote computer to command pressure points in a calibration sequence and collect data from the local computer. The remote host computer can automatically acquire data from the device under test without an operator present.

A pump unit contains the self-recharging pump that allo
automatic valves, system and pump pressure sensors,
provided for AC power, video display cables, and an IEE

The Model 2492 auto mass loader contains the piston/cylinder assembly, main mass and binary mass handling equipment, table lift mechanism, resistance temperature device, and float position indicator.

Easy operator access to the auto mass loader allows for trim masses to be loaded by hand. Reach any pressure setpoint within the range and resolution of the instrument.

ows for continuous operation, a control computer,
and pump position sensor. Back panel connections are
E-488 GPIB interface.

Mass Sets

Ruska Instrument mass sets use a combination of equal masses and binary masses to provide a total of 160 pressure points automatically for each piston/cylinder assembly. When a pressure point is defined, the system generates the nearest achievable pressure value. Nineteen large main masses are successively applied to obtain the bulk of the mass required to balance the pressure generated by the pump. Three smaller binary masses are then individually applied to subdivide the pressure measurement to within one part in 160. The operator does not need to be present during stabilisation. Additional trim masses may be loaded to achieve any pressure within the range and resolution of the instrument.

Automatic Features

The Model 2492 automatically

- pressurises the system
- loads masses
- performs pressure-to-mass calculations and all corrections
- detects system stability by measuring and evaluating piston float position, temperature stability, and piston sink rate
- provides for automatic selection of up to 160 discrete pressure points per piston/cylinder, plus atmosphere
- calculates corrections for environmental factors
- retains data in memory for up to three piston/cylinder assemblies, one mass set, environmental parameters, and sensor calibration coefficients
- provides head pressure correction for reservoir level when generating zero gauge pressure
- displays float position and in-range setpoints
- uses metric (bar) or Imperial (psi) measurements for mass set, piston/cylinder set, float position, and pressure head data
- allows selection of pressure units from a list of 14 common units

Support

Ruska Instrument provides full support for your Model 2492 and your entire calibration laboratory. Calibration services, repair, and training are all available.

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Specifications

GENERAL

Pressure ranges
2 to 2750 bar gauge via three piston/cylinder assemblies
High range: 17–2750 bar g
Mid range: 8.6–1380 bar g
Low range: 2–275 bar g
Interchangeable piston/cylinder assemblies can be changed in less than 30 minutes

Auto mass loader dimensions
141 cm H x 67.4 cm W x 67.4 cm D

Pump unit dimensions
91.4 cm H x 67.4 cm W x 67.4 cm D

Weight
450 kg

Electrical power
115 or 230 VAC, 50/60 Hz

Temperature
Operating temperature 18–28 °C; storage temperature 0–55 °C

Humidity
Operating humidity 20–75% noncondensing;
storage humidity 0–90% noncondensing

Pressure medium
Spinesstic 22 oil

PISTON/CYLINDER ASSEMBLIES

Accuracy*
High range: greater of 75 ppm or 1.72 mbar
Mid range: greater of 55 ppm or 0.758 mbar
Low range: greater of 35 ppm or 0.138 mbar

Precision (Type A uncertainty)
Less than 6 ppm (2σ typical)

Stability per year
Less than type A uncertainty

Resolution
Greater of 1 ppm or 100 mg

Materials
Cemented tungsten carbide

Thermal coefficient
9.1E-06/°C

Temperature display resolution
±0.1 °C

Float position display resolution
±0.001 cm

MASS SET

Materials
Nonmagnetic austenitic 300 Series stainless steel with no loose-fill materials

Due to Ruska Instrument's process of continuous improvement, the printed specifications are subject to change without notice.

* Accuracy as used here is defined as the 2-sigma root-sum-square Total Uncertainty in Pressure as determined from the method described in ISO "Guide to the Expression of Uncertainty in Measurement," and represents a 95% level of confidence. These claims are subject to limitations in the state-of-the art uncertainty where available in pressure measurement at NIST and on strict procedure, training, and environmental controls at the location where used.

Other products and services

Ruska manufactures a range of piston gauges for pressures from 14 mbar to 5000 bar and digital pressure controllers from 0.07 to 2750 bar, air data test sets, and portable pressure indicators. Ruska also offers a complete line of fluid phase behaviour instrumentation and ancillary items, mass-sorption systems (McBain-Bakr apparatus), and custom quartz component design and manufacturing. Repair and recalibration services are available to support our equipment worldwide. Regular training courses are held in Houston, Texas for all Ruska products.

Ruska provides a complete line of digital pressure controllers and gauges/indicators for automated pressure test and measurement.

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