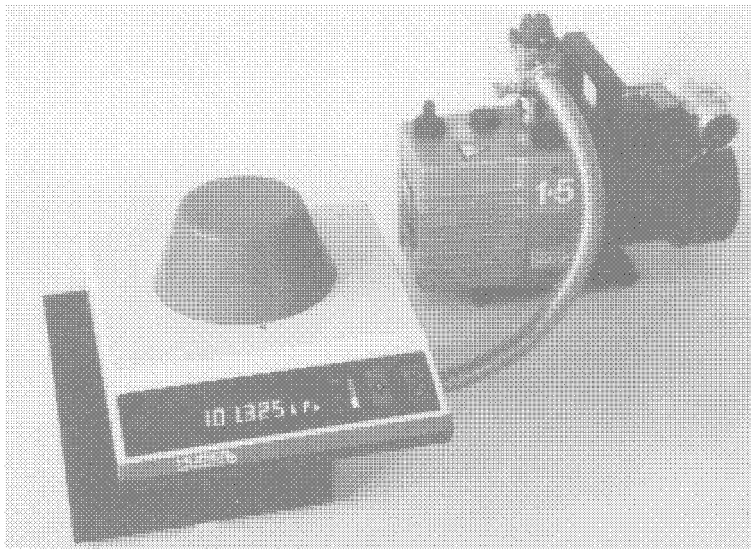


HUBER INSTRUMENTE

Militärstrasse 15, CH-4410 Liestal
 Tel. +41 (0)61 921 50 60
 Fax +41 (0)61 921 0121
 www.huber-i-l.com
 E-Mail: info@huber-i-l.com

ABSOLUTE & DIFFERENTIAL PRESSURE STANDARDS Types PDF 3000

Class 0.03 %



Fields of Application

The Differential Pressure Primary Standards allows the measurement of differential and especially absolute pressure with the same measuring ranges, high accuracies and the same great reliability as those of the Pressure Primary Standards for relative pressure. By its easy manipulation and its stability with a zero value reproducible at any time, it is specially adapted to calibrate

- » absolute and differential pressure transmitters
- » transducers
- » calibrators
- » hand-manometers etc.

surely and traceable in accordance with EN ISO 9000, FDA, OSHA or similar quality assurance requirements.

Basic Principle

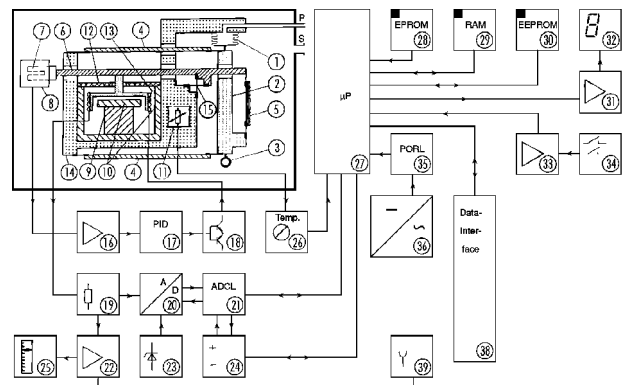
The operating principle employed corresponds to the basic definition of pressure (Pressure equal force divided by area). The fluidic pressure to be measured is introduced into an elastic element of known effective area. The force generated loads a force measuring cell with electronically controlled force compensation. The compensation current is indicated in digital form.

Design Concept

A precision balance with electronically controlled force compensation serves as base of the Differential Pressure Primary Standards. Instead of the weighing pan, a superstructure supports the elastic pressure sensing element.

A change of pressure in the elastic element produces a slight deviation of the force sensing element which is being detected by an opto-electronic device. This signal is used by a PID-controller to change its output voltage which, through the compensation coil, nulls the force sensing element again. The current flowing

through the coil being proportional to the pressure is converted by the measuring resistor into the measurement voltage. Its value, digitised by the AD converter, is fed to the microprocessor which sends the corrected value to the digital display in pressure units.



The Differential Pressure Primary Standard has its complete force sensing system housed in a pressure and vacuum tight metal case which is subjected to a

reference pressure or vacuum. Major benefits realized by this design concept include:

- » any friction of mechanical parts (in vacuum something very problematic) is avoided
- » zero value easy to check with bypass
- » adapted even for lowest measuring ranges
- » no perceptible hysteresis

Special Features

The Differential Pressure Primary Standard has all further outstanding features of the Pressure Primary Standards as they are mentioned in the respective documentation which forms an integral part to these indications. The most interesting ones only are to be found in the following:

- » Measuring ranges between 0...1 kPa and 60 MPa, with a dual range of 10 or 33 %
- » Convertible pressure units
- » Bidirectional RS-232-C data interface as standard, IEEE 488 (GPIB) or TTY as options
- » Analogue output, remote display and handling
- » Two calibration procedures, the first with pressure from a primary standard, the second MASCAL calibration procedure permits a fundamental self-check and eventually adjustment with one single mass of one kilogramme.

Technical Characteristics

Max. Error:	± 0.03 %
Resolution:	0.003 % (nominal range) 0.001 % (second range)
Engineering Units:	kPa, mbar, bar, mmH ₂ O, kp/cm ₂ , mmHg, PSI, inH ₂ O, inHg, %
Digital Display:	7-Seg. LED, 14 mm
Analogue Display:	LED bar scale 0...100%
Reproducibility:	0.005 %
Response Time:	~ 2.5 s
Operating Temperature:	15...35 °C
Effect of Temperature, Zero:	± 0.005 %/K
Sensitivity:	± 5 ppm/K
Reference Pressure: (Static Pressure)	Vacuum to max. 1.6 MPa
Overload Capacity:	25...50 %
Connection, Pressure:	spec. O-Ring connection type
Reference Press.:	KF 16
Power Supply:	110/230 VAC, 50/60 Hz
Power Consumption:	~ 12 W (VA)
Net Weight:	14.5 kg
Dimensions:	275 x 285 x 230 mm
Data Interface:	RS-232-C (TTY/IEEE 488)
Analogue Output:	0...1 V

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Absolute Pressure Measurements

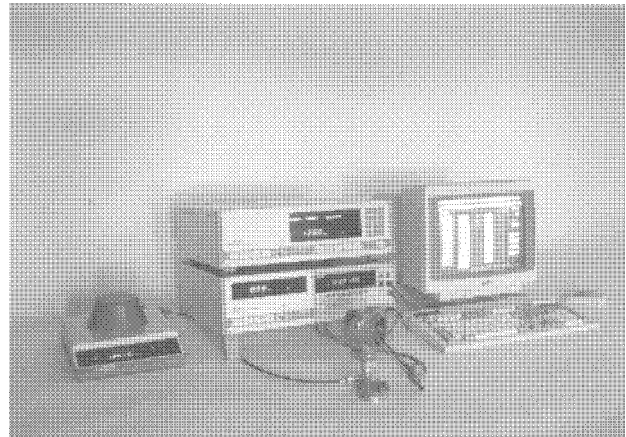
Because of the important volume of the case and the components housed in it, like the compensation coil, which contain large amounts of residual air, the reference connection has to be evacuated continually for absolute pressure measurements. A small dual-stage rotary vane vacuum pump is appropriate for this purpose.

After the achievement of thermal stability, taking much longer under vacuum, the integrated by-pass valve is closed and with the measurement connection open to atmosphere, the barometric pressure will be displayed.

With low measuring ranges, where the existing barometric pressure alone could generate an overload, a protection circuit is integrated, which holds the by-pass valve open.

Options

Calibration and Quality Assurance Software



For the realisation of fully automatic, optimum pressure calibration processes, several versions of software are available to the operator: So one for Computer Aided (CAC) and one for Computer Controlled Calibration (C³) with modules for relative, absolute, negative and/or differential pressure running under MS-DOS as well as an integrated solution for quality assurance and inventory control the Instrument Maintenance Management System (IMMS) running under WINDOWS.

Increase of Accuracy

Integrated in the calibration software mentioned above, a limitation of the uncertainty to only 0.01 % can be reached with the Differential Pressure Primary Standards.

The detailed technical specifications of the different options are to be found in separate documentations.

Technical specifications, data and design are subject to change without notice
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HUBER
INSTRUMENTE

Militärstrasse 15
CH-4410 Liestal
Tel. +41 (0)61 921 50 60
Fax +41 (0)61 921 0121
info@huber-i.com