Dual Digital Barometer Model 7190

The Model 7190 Dual Digital Barometer is a fully compensated dual digital barometer designed to cover a wide environmental pressure and temperature range. It can be used successfully both in accurate pressure measurement applications at room temperature and in demanding automatic weather station applications.

The 7190 digital barometer uses a silicon capacitive absolute sensor. The sensor has excellent hysteresis and repeatability characteristics, a low temperature dependence, and a very good long-term stability. The ruggedness of the sensor is outstanding.

The measurement principle of the 7190 digital barometer is based on an advanced RC oscillator and three reference capacitors, against which the capacitive pressure sensor and the capacitive temperature compensation sensor are continuously measured. The microprocessor of the barometer performs compensation for pressure linearity and temperature dependence.

The basic pressure and temperature adjustment of the pressure transducers in the 7190 digital barometer consists of seven temperature levels over the operating temperature range of the barometer and seven to nine pressure levels over the operating pressure range of the barometer at each temperature level. The calculated individual basic pressure and temperature adjustment coefficients are stored in the EEPROM of each pressure transducer. The user cannot change these basic factor adjustments.

The 7190 digital barometer has two pressure transducers. Two pressure transducers provide for a self-diagnostic feature: the user can set alarm limits within which the pressure transducers must remain for reliable measurement. The 7190 barometer can also be configured to measure two separate pressures.

The user can define various applications and specific settings, such as serial bus settings, averaging time, output interval, output format, pressure unit and pressure resolution. It is also possible to select different sending modes at power-up, such as free running mode, stand-by mode, and a mode with one automatically sent message. A fast measurement mode with ten measurements per second can also be selected.

In addition to the standard RS 232C full duplex and bi-directional TTL level serial interface, the user can select either an RS-485/422 two-wire half duplex serial interface or a pulse output interface with user-selectable pulse rate, pressure resolution, and pressure offset.

The 7190 digital barometer is traceable to National Institute of Standards and Technology (NIST) in the USA.

SYSTEMS

Specifications

Barometric pressure

Operating Range	
Pressure range	500-1100hPa
Operating temperature range	-40 to +60ºC
Storage temperature range	-60 to +60ºC
Humidity range	non-condensing
Accuracy	
Linearity *	± 0.05hPa
Hysteresis *	± 0.03 hPa
Repeatability*	± 0.03 hPa
Calibration uncertainty **	± 0.08 hPa
Temperature dependence ***	± 0.1 hPa
Long-term stability	± 0.1 hPa / year
Total including one year drift	± 0.20 hPa

* Defined as the ± standard deviation limits of end-point non-linearity, hysteresis error or repeatability error.

** Defined as ± standard deviation limits of inaccuracy of the working standard at 1000 hPa in comparison to internatinal standards (NIST).

*** Defined as ±2 standard deviation limits of temperature dependence over the operating temperature range.

Electronics

(factory settings)*

Supply voltage	10-35 VDC, reverse polarity protected
Supply voltage sensitivity	negligible
Current consumption	< 25 mA (continuous operation mode) < 0.1 mA (hardware shutdown mode)
Pressure units	hPa*, kPa, Pa, mbar, inHg, mmHg, torr, psia
Resolution	0.01 hPa*
Setting time at power-up	
one sensor	2 seconds*
Response time	
one sensor	500 ms*
fast measurement mode	100 ms*
Acceleration sensitivity	negligible

Mechanics

Pressure connector	M5 (10-32) internal thread
Pressure fitting	barbed fitting for 1/8" I.D. tubing (Clippard 11752-1 hose fitting)
Maximum pressure limit	5000 hPa abs.
Minimum pressure limit	0 hPa
Electrical connector	female 9-pin subD-connector
Housing	epoxy painted aluminium
Weight	1 kg
Dimensions	5.71" W x 4.72" H x 2.56" D (145 mm x 120 mm x 65 mm)

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