

# BLUE RIBBON CORP.

## Glossary of Terms

### A

#### **Absolute Pressure**

The combined local pressure induced by some source and the atmospheric pressure at the location of the measurement.

#### **Absolute Zero**

Temperature at which thermal energy is at a minimum. Defined as Kelvin, calculated to be  $-273.16^{\circ}\text{C}$  or  $-459.69^{\circ}\text{F}$ .

#### **Acceleration Sensitivity**

The electrical output of a pressure transducer at zero applied pressure input, caused by static or dynamic acceleration applied to the transducer case. It is expressed as a percentage of full-range output per "g".

#### **Accuracy**

The ratio of the error to the full-scale output or the ratio of the error output, as specified, expressed in percent. Accuracy may be expressed in terms of units of measurand, or as with  $\pm$  percent of full-scale output, or span.

#### **Ambient Conditions**

The condition(s) around the transducer (pressure, temperature, etc).

#### **Ambient Pressure**

The pressure of the medium surrounding the transducer.

#### **Ambient Temperature**

The average or mean temperature of the surrounding air, which comes in contact with the equipment and instrument under test.

#### **Amplifier**

An electronic device which boosts or increases a small signal to a higher level, usually for transmission, scale convenience or noise immunity.

#### **Analog**

A voltage or current signal that is a continuous function of the measured parameter.

#### **ANSI**

American National Standards Institute.

### B

#### **Background Noise**

The total noise floor from all sources of interference in a measurement system independent of the presence of a data signal.

#### **Boiling Point**

The temperature at which a substance in the liquid state transforms to the gaseous state (commonly refers to the boiling point of water ( $100^{\circ}\text{C}$  or  $212^{\circ}\text{F}$ ) at sea level).

### B

#### **Breakdown Voltage Rating**

The AC or DC voltage, which can be applied across the insulation portion of a transducer without arcing or conduction above a specific current value.

#### **BTU: British Thermal Unit**

The quantity of thermal energy required to rise one pound of water  $1^{\circ}\text{F}$  at or near its maximum density ( $39.1^{\circ}\text{F}$ ).

#### **Burst Pressure**

The maximum pressure applied to a transducer sensing element or case without causing leakage.

### C

#### **Calibration**

The process of adjusting an instrument or compiling a deviation chart so that its reading can be correlated to the actual value being measured.

#### **Calibration Cycle**

Pressure calibration in ascending and descending duration.

#### **Cavitation**

The boiling of a liquid caused by a decrease in pressure rather than an increase in temperature.

#### **Chatter**

The rapid cycling on and off of a control process relay due to insufficient bandwidth in the controller.

#### **Common-Mode Rejection Ratio**

The ability of an instrument to reject interference from a common voltage at its input terminals with relation to ground; usually expressed in dB.

#### **Common-Mode Voltage**

The AC or DC voltage which is tolerable between signal and ground. One type of CMV is specified between signal low and power ground.

#### **Compensation**

The addition of specific material or device(s) to counteract a known error.

#### **Controlled Variable**

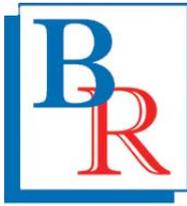
A process variable which is to be controlled at some desired value by means of error; i.e. cold junction compensation for thermocouples.

#### **Current Loop**

A two-wire loop in which the current through the wires is maintained according to a controlling device, usually a two-wire transmitter. The advantages of a current loop are longer distance signal transmission, better noise immunity, and the ability to power the two-wire transmitter throughout the same two wires. The most common current loop is 4 to 20 mA.

#### **Cycle time**

The time usually expressed in seconds for a controller to complete one on/off cycle.



# BLUE RIBBON CORP.

## D

### DC

Direct Current

### Damping

The energy-dissipating characteristic, which, together with natural frequency, determines the limit of frequency response and the response time characteristic of a transducer, instrument, or system. In response to a step change of input or measurand, an underdamped system oscillates about its final steady value and an overdamped system come to rest without overshoot, and a critically-damped system is at the point between the underdamped and overdamped.

### Dead Band

The range through which input can be varied without initiating observable change in output. (There is a separate and distinct input-output relationship for increasing and decreasing signals.)

### Dead Volume

The volume of the pressure port of a transducer at room temperature and ambient barometric pressure.

### Deviation

The difference between the value of the controlled variable and the value at which it is being controlled.

### Defferential Pressure

The static pressure difference generated by the primary device when there is no difference in elevation between the upstream and downstream pressure taps.

### Digital Output

An output signal, which represents the size of a stimulus or input in the form of a series of discrete quantities.

### Disturbance

An undesired change that takes place in a process(es) that tends to affect adversely the value of a controlled variable.

### Drift

An undesired change in output over a period of time, of which change is not a function of the measurand.

## E

### End Point

The output at zero pressure and full-scale pressure.

### Environmental Conditions

All conditions to which a transducer may be exposed during shipping, storage, handling, and operation.

### Error

The difference between the value indicated by the transducer and the true value of the pressure being sensed.

### Error Band

The allowable deviation of output from specific reference norm.

### Excitation

The external application of electrical voltage/ current applied

## E

### Explosion-Proof Enclosure

An enclosure that can withstand an explosion of gases within it and prevent the explosion of gases surrounding it due to sparks, flashed or the explosion of the container itself, and maintain an external temperature that will not ignite the surrounding gases.

## F

### Fahrenheit

A temperature scale defined by 32° at the ice point and 212° at the boiling point of water at sea level.

### Filter

A device to sort desired result from undesired. Electrically, a selective circuit which passes through certain frequencies, while attenuating or rejecting others.

### FM-Approved

An instrument that meets a specific set of specifications established by the Factory Mutual Research Corporation which sets industrial safety standards.

### Freezing Point

The temperature at which the substance goes from a liquid phase to a solid phase.

### Frequency Natural

The frequency of free (not forced) oscillation of a transducer, mechanical apparatus, or electrical circuit.

### Frequency Output

An output in the form of frequency, which varies as a function of the applied input.

### Frequency Response

The change with frequency of the output measurand amplitude ratio (and of the phase difference between output and measurand), for a sinusoidally varying input applied to a transducer, instrument or stem. It is usually specified as "within +/- percent (or +/- dB) to Hz".

### Full Bridge

A Wheatstone Bridge configuration utilizing active elements or strain gauges.

### Full Scale Output

The algebraic difference between the zero pressure output and full scale pressure output.

## G

### Gauge Factor

A measure of the ratio of the relative change of resistance to the relative change in length of a piezoresistive strain gauge.

### Gauge Pressure

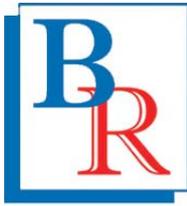
The difference between the local absolute pressure of the fluid and the atmospheric pressure at the place of the measurement.

### Gain

The ratio of the change in output to the change in input, which caused it.

2770 Long Road, Grand Island, NY 14072 USA

Tel. (716) 773-9300 • Fax (716) 773-5019 • [brsales@blueribboncorp.com](mailto:brsales@blueribboncorp.com) • [www.blueribboncorp.com](http://www.blueribboncorp.com)



# BLUE RIBBON CORP.

## G

### Ground

The reference point of an electrical system, or alternatively, the local earth potential (earth ground).

## H

### Half Bridge

2 active elements or strain gauges.

### Heat

Thermal energy. Heat is expressed in units of calories or Btu's.

### Hertz (HZ)

Units in which frequency is expressed. Synonymous with cycles per second.

### Humidity, Relative

The moisture content of air relative to the maximum that the air can contain at the same pressure and temperature.

### Hysteresis

The difference in output when the pressure value is first approached with increasing pressure and then with decreasing pressure.

## I

### Input Impedance

The resistance measured across the excitation terminals of a transducer.

### Insulation Resistance

The resistance measured between two insulated points on a transducer when a specific DC voltage is applied at room temperature.

### Intrinsically Safe

An instrument which will not produce any spark or thermal effect, under normal or abnormal conditions, that will ignite a specified gas mixture.

### Isolation

Allowing a difference in potential (voltage) between the reference point (ground) of two circuits without any appreciable current flow between them.

## K

### Kelvin

(Symbol K) The units of absolute or thermodynamic temperature scale based upon the Celsius scale with 100 units between the ice point and boiling point of water.  $0^{\circ}\text{C} = 273.16\text{K}$  (there is no degree [°] symbol used with the Kelvin scale).

## L

### Life Cycle

The minimum number of pressure cycles the transducer can endure and still remain within a specified tolerance.

### Linearity

The closeness of a calibration curve to a specific straight line between end points.

## L

### Linearity (End Point/or Terminal)

Linearity as referring to a straight line between end points.

### Load Impedance

The impedance presented to the output terminals of a transducer or instrument by the associated external circuitry.

### Loop Gain

The product of the gains of all the elements in a loop.

## M

### Measurand

A physical quantity, property or condition which is measured. The term measurand is preferred to "input", "parameter to be measured", "physical phenomenon", "stimulus", and/or "variable."

### Melting Point

The temperature at which a substance transforms from a solid phase to a liquid phase.

### Mounting Error

The error resultant from installing the pressure transducer, both electrical and mechanical.

## N

### Noise

An unwanted signal which can contribute to errors in measurement. Examples are hum (power lines), radio frequency interference (RFI), electromagnetic interference (EMI), and broadband or white noise.

### NEMA-4

A standard from the National Electrical Manufacturers Association, which defines enclosures for indoor or outdoor use primarily to provide a degree of protection against windblown dust, rain, and/or splashing water.

## O

### Output

The electrical signal, which is produced by a pressure applied to the transducer sensor.

### Output Impedance

The impedance across the output terminals of a transducer or instrument presented to the associated external circuitry.

## P

### PH

The negative base-ten logarithm of the hydrogen-ion activity in a solution.

### PID

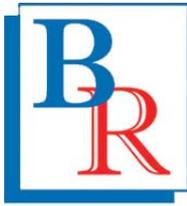
Proportional, Integral, Derivative. A three-mode control action where the controller has time portioning, integral (auto reset), and derivative action.

### Polarity

In electricity, the quality of having two oppositely charged poles, one positive and one negative.

2770 Long Road, Grand Island, NY 14072 USA

Tel. (716) 773-9300 • Fax (716) 773-5019 • [brsales@blueribboncorp.com](mailto:brsales@blueribboncorp.com) • [www.blueribboncorp.com](http://www.blueribboncorp.com)



# BLUE RIBBON CORP.

## P

### **Positive Feedback**

A closed loop in which any change is reinforced until a limit is eventually reached.

### **Potentiometer**

A variable resistor often used to control a circuit.

### **Power Supply**

A separate unit or part of a circuit that supplies power to the rest of the circuit or to a system.

### **Primary Loop**

The outer loop in a cascade system.

### **Proof Pressure**

The maximum amount of pressure that can be applied to a pressure transducer without changing any specification.

### **PSIA**

Pounds per square inch absolute. Pressure referenced to a vacuum.

### **PSIG**

Pounds per square inch gauge. Pressure referenced to ambient air pressure.

## R

### **Range**

The upper and lower pressure limits that a transducer is required to measure.

### **Recovery Time**

The length of time that it takes a transducer to return to normal after applying a proof pressure.

### **Repeatability**

The ability of a transducer to repeat its output signal at a given pressure in one direction repeatedly.

### **Rate Time**

The time interval over which the system temperature is sampled for the derivative function.

### **Resolution**

The magnitude of output step changes as pressure is varied continuously over the range and usually expressed as a percentage of range. (Primarily applies to potentiometric type units. Strain gauge units' resolution is infinite).

### **Reference Junction**

The cold junction in a thermocouple circuit, which is held at a stable known temperature. The standard reference temperature is 0°C (32°F); however, other temperatures can be used.

### **Response Time**

The length of time required for the output of a transducer to rise to a specified percentage of its final value.

### **RFI**

Radio Frequency Interference.

### **Room Condition**

Ambient conditions used for test purposes.

## S

### **Self-Heating**

Internal heating of a transducer as a result of power dissipation.

### **Self-Regulation**

The property of a process or machine which permits attainment of equilibrium, after a disturbance, without the intervention of a controller.

### **Sensing Element**

The part of a transducer, which reacts directly in response to the pressure.

### **Sensitivity**

The ratio in a transducer output change versus a change in applied pressure.

### **Sensitivity Shift**

A change in the calibration slope.

### **Set Point**

An input variable which sets the desired value of a controlled variable.

### **Shield**

A protective enclosure surrounding a circuit or cable which is to protect it from an electrical disturbance such as noise.

### **Signal Conditioner**

A module or device which condition an electrical signal in order to make it more useful. A signal conditioner often contains an amplifier and filter, and may provide isolation, linearization, compensation and other functions.

### **Signal Conditioning**

To process the form or mode of a signal so as to make it intelligible to, or compatible with, a given device, including such manipulation as pulse shaping, pulse clipping, digitizing, and linearizing.

### **Stability**

The ability of a transducer to retain performance throughout its life span.

### **Strain Gauge**

A measuring element for converting force, pressure, tension, etc., into an electrical signal.

### **Static Calibration**

A calibration recording pressure versus output at room temperature.

### **Static Error Band**

The error band applicable at room temperature.

### **Static Pressure**

The pressure of a fluid or gas at rest.

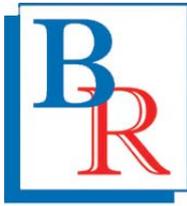
## T

### **Temperature Range Operable**

The range of ambient temperature, given by their extremes, within which the transducer is intended to operate.

2770 Long Road, Grand Island, NY 14072 USA

Tel. (716) 773-9300 • Fax (716) 773-5019 • [brsales@blueribboncorp.com](mailto:brsales@blueribboncorp.com) • [www.blueribboncorp.com](http://www.blueribboncorp.com)



# BLUE RIBBON CORP.

## T

### **Temperature Range, Compensated**

The range of ambient temperature for which Thermal Zero Shift is applicable (temperature error). Operation outside this range may require re-calibration.

### **Thermal Coefficient of Resistance**

The changes in resistance of semiconductor per unit change in temperature over a specific range of temperature.

### **Thermal Sensitivity Shift**

The sensitivity shift due to changes of the ambient temperature from room temperature to the specified limits of the compensated temperature range.

### **Thermal Zero Shift**

An error due to changes in ambient temperature in which the zero pressure output shifts. Thus, the entire calibration curve moves in parallel displacement.

### **Transducer**

In the broadest sense it is a device (or medium) that converts one energy form to another. Therefore, items such as a windmill, electric light, or an automobile engine could be called a "transducer" - but, in common practice, the term is generally applied to devices that take a physical phenomenon (pressure, temperature, humidity, flow, etc.) and converts it to an electrical output.

### **Transmitter**

A device which translates the low-level output of a sensor or transducer to a higher level signal which is suitable for transmission to a site where it can be processed further.

### **True RMS**

The true Root-Mean-Square of an AC or AC-plus-DC signal which is often used to determine power of a signal. For a perfect sine wave, the RMS value is 1.11072 times the rectified average value, which is utilized for low cost metering.