Glossary

Accuracy

Stated as a limit tolerance which defines the average deviation between the actual output versus theoretical output.

In practical, transducer applications, the potential errors of nonlinearity, hysteresis, non-repeatability and temperature effects do no normally occur simultaneously, nor are they necessarily additive.

Therefore, accuracy is calculated based upon the RMS value of potential errors, assuming a temperature band of +/- 10°F, full rated load applied, and proper set up and calibration. Potential errors of the readout, crosstalk, or creep effects are not included.

Ambient conditions

The conditions (humidity, pressure, temperature, etc.) of the medium surrounding the transducer.

Ambient temperature

The temperature of the medium surrounding the transducer.

Angular load, concentric

A load applied concentric with the Primary Axis at the point of application, and at some angle with respect the Primary Axis.

Angular load, eccentric

A load applied eccentric with the Primary Axis at the point of application, and at some angle with respect the Primary Axis.

Axial load

A load applied along a line concentric with the Primary Axis.

Calibration

The comparison of transducer outputs against standard test loads.

Calibration curve

A record (graph of the comparison of transducer outputs against standard test loads.

Combined errors

(Nonlinearity & Hysteresis)

The maximumdeviation from the straight line drawn between the original no-load and Rated Load outputs expressed as a percentage of the Rated Output and measured on both increasing and decreasing loads.

Compensation

The utilization of supplementary devices, materials, or processes to minimize know sources of errors.

Creep

The change in transducer output occurring with time, while under load, and with all environmental conditions and other variables remaining constant.

Note: Usually measured with Rated Load applied and expressed as a percent of Rated Output over a specific period of time.

Creep Recovery

The change in no-load output occurring with time, after removal of a load which has been applied for specific period of time.

Crosstalk

With one component loaded to capacity, and the other unloaded, the output of the unloaded component will no exceed the percentage specified of its full scale capacity.

Deflection

The change in length along the Primary Axis of the load cell between no-load and Rated Load conditions.

Drift

A random change in Output under constant Load conditions.

Eccentric Load

Any load applied parallel to, but not concentric with, the Primary Axis.

Error

The algebraic difference between the indicated and true value of the load being measured.

Excitation, electrical

The voltage or current applied to the input terminals of the transducer.

Fatigue capacity

Capacity as a percentage of the nominal load limit capacity, and based on 100 x 10^6 cycles (minimum) from zero to full fatigue capacity and 50 x 10^6 cycles (minimum) from full fatigue capacity tension to full fatigue capacity compression load.

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Hysteresis

The maximum difference between the transducer output readings for the same applied load; one reading obtained by increasing the load from zero and the other by decreasing the load from Rated Load. Note: Usually measured at half Rated Output and expressed in percent of Rated Output. Measurements should be taken as rapidly as possible to minimize Creep.

Insulation resistance

The DC resistance measured between the transducer circuit and the transducer structure. Note: Normally measured at fifty volts DC and under Standard Test Conditions.

Load

The weight, torque, or force applied to the transducer.

Load cell

A device which produces an Output signal proportional to the applied weight or force.

Natural frequency

The frequency of free oscillation under no-load conditions.

Nominal load limit capacity

It is designed normal maximum capacity of a transducer is based on this capacity unless specified.

Nonlinearity

The maximum Deviation of the Calibration Curve from a straight line drawn between the no-load and Rated Load outputs, expressed as a percentage of the Rated Output and measured on increasing load only.

Output

This signal (voltage, current, etc.) produced by the transducer.

Note: Where the output is directly proportional to excitation, the signal must be expressed in terms of volts per volt, volts per ampere, etc. of excitation.

Output, rated

The algebraic difference between the Outputs at no-load and at Rated Load.

Overload rating

The maximum load in percent of Rated Capacity which can be applied without producing a permanent shift in performance characteristics beyond those specified.

Overload static rating

Ultimate Extraneous Limit

Only one Ultimate Static Extraneous Load Limit (200% of Static Extraneous Load Limit (F_x or F_y or M_x or M_y or M_z) can be applied simultaneously with 100% of the nominal load limit capacity without producing a structural failure.

Primary axis

The axis along which the transducer is designed to be loaded; normally its geometric centerline.

Rated capacity (Rated load)

The maximum Axial Load that the transducer is designed to measure within its specifications.

Reference standard

A force measuring device whose characteristics are precisely known relative to a primary standard.

Repeatability

The maximum difference between transducer output readings for repeated loadings under identical loading and environmental conditions.

Resolution

The smallest change in mechanical input which produces a detectable change in the output signal.

Sensitivity

The ratio of the change in Output to the change in mechanical input.

Shunt calibration

Electrical simulation of transducer output by insertion of known shunt resistors between appropriate points within the circuitry.

Shunt-to-Load correlation

The difference in output readings obtained through electrically simulated and actual applied loads.

Standard test conditions

The environmental conditions under which measurements should be made, when measurements under any other conditions may result in disagreement between various observers at different times and places. Three conditions are as follows:

Temperature:
73° +/- 4° F (23° +/- 2° C)

Relative humidity:
90% or less

Barometric pressure:
28 to 32 in. Hg

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Static extraneous load limits

(300% of the Nominal Load Capacity)

Static extraneous load limits are calculated such that only one extraneous load (F_x or F_y or M_x or M_y or M_z) can be applied simultaneously with 50% of the nominal load limit applied.

Temperature effect on output

The change in output due to a change in transducer temperature. Note: Usually expressed as a percentage of load per degree Fahrenheit change temperature.

Temperature effect on zero balance

The change in zero balance due to a change in transducer temperature. Note: Usually expressed as the change in zero balance in percent of rated output per degrees Fahrenheit (change in temperature).

Temperature range, compensated

The range of temperature over which the transducer is compensated to maintain rated output and zero balance within specified limits.

Temperature range, safe

The extremes of temperature within which the transducer will operate without permanent adverse change to any of its performance characteristic.

Terminal resistance

The resistance of the transducer circuit measured at specific adjacent bridge terminals, at standard temperature, with no-load applied, and with the excitation and output terminal open-circuited.

Terminal resistance, excitation

The resistance of the transducer circuit measured at the excitation terminal, at standard temperature, with no-load applied, and with excitation and output terminals open-circuited.

Terminal resistance, signal

The resistance of the transducer circuit measured at the output signal terminals, at standard temperature, with no-load applied, and with the excitation terminals open-circuited.

Traceability

The step-by-step transfer process by which the transducer calibration can be related to primary standards.

Zero balance

The output signal of the transducer with rated Excitation and with no-load applied, usually expressed in percent of Rated Output.

Zero return

The difference in Zero Balance measured immediately before Rated Load application of specified duration and measured after removal of the load, and when the output has stabilized.

Zero shift, permanent

A permanent change in the no-load output.

Zero stability

The degree to which the transducer maintains its Zero Balance with all environmental conditions and other variables remaining constant.