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Sensing and Control
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Sensing and Control

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Glossary of Terms

- A -

ALTERNATING CURRENT (AC) – One that reverses at regularly recurring intervals of time and has alternately positive and negative values.

ACTUATOR – Mechanism of the switch or switch enclosure which operates the contacts.

ALL-METALS RESPONSIVE CONTROLS – These controls may be mounted close to any non-metallic material without affecting operation. If it is necessary to mount these sensors near metallic objects, mounting hardware and nearby stationary metal objects should be in place when sensitivity is adjusted. Any extraneous moving metal objects must be isolated from the sensor.

ANALOG OUTPUT – Having the property of being continuously variable, as opposed to having discrete states.

AUXILIARY ACTUATOR – A mechanism, sold separately, to provide basic switches with easier means of operation and adjustment and adapt switches to different operating motions by supplying supplemental overtravel.

- B -

BASIC SWITCH – A self-contained switching unit. It can be used alone, gang-mounted, built into assemblies or enclosed in metal housings.

BREAK – To open an electrical circuit.

- C -

COMPLEMENTARY OUTPUT – Both N.O. and N.C. outputs are available for use.

CONVERTIBLE OUTPUT – Output that can be wired either as Normally Open or Normally Closed, but not at the same time.

CURRENT – Time value of movement of free electrons. One ampere equals one coulomb per second. Conventional reference is opposite to direction of actual electron movement.

CURRENT CONSUMPTION – The amount of current required to power a sensor or control (excluding load). See SUPPLY CURRENT.

CURRENT SINKING – An output type such that when it is On, current flow is from the load into the device's output, then to ground. Output is Normally High.

CURRENT SOURCING – An output type such that when it is On, current flow is from the device into the load. Output is Normally Low.

- D -

DIFFERENTIAL TRAVEL (D.T.) – Plunger or actuator travel from point where contacts "snap-over" to point where they "snap-back."

DIGITAL (OUTPUT) – Output that is of only two stable states, operating in the manner of a switch; that is, it is either On or Off or High.

DIRECT CURRENT (DC) – A unidirectional current in which changes in value are so small that they may be neglected. As ordinarily used, the term designates a practically non-pulsating current.

DOUBLE BREAK CONTACTS – (Twin break). This breaks the circuit in two places. Referred to as form Z circuitry also.

DOUBLE-POLE DOUBLE-THROW (DPDT) – Switches which make and break two separate circuits. This circuit provides a normally open and normally closed contact for each pole.

- E -

ECKO – See Eddy Current Killed Oscillator.

EDDY CURRENT KILLED OSCILLATOR – A transducer operated on the principle of changing the reactance of the tank circuit of an oscillator enough to stop the oscillations, which trigger the output.

ENVIRONMENT-PROOF SWITCH – A switch which is completely sealed to ensure constant operating characteristics. Sealing normally includes an "O" ring on actuator shaft and fused glass-to-metal terminal seals or complete potting and an elastomer plunger-case seal.

- F -

FALL TIME – A measure of the time required for the output voltage of a circuit to change from a high voltage level to a low voltage level, once a level change has started (90% to 10%).

FALSE PULSE – An improper change of state of the output, usually associated with power Turn-On or Turn-Off.

FALSE PULSING – Circuitry designed to clamp output Off until the power supply has time to reach proper voltage level. Typically 200-500 msec.

FERROMAGNETIC RESPONSIVE CONTROLS – These controls may be mounted close to any non-metallic or non-ferrous materials with no effect on operation. If it is necessary to mount the sensors near ferrous materials, mounting hardware and nearby stationary ferrous material should be in place. Any extraneous moving ferrous material must be isolated from the sensor.

FREE POSITION (F.P.) – Position of switch plunger or actuator when no external force is applied (other than gravity).

FULL OVERTRAVEL FORCE – Force required to attain full overtravel of actuator.

- G -

GAUSS – The CGS unit of magnetic induction or flux density. 1 Gauss=1 maxwell/sq. cm.

GROUND – A conducting path, intentional or accidental, between an electric circuit or equipment and the earth, or some large conducting body serving in place of the earth (a voltage reference).

Glossary of Terms

- H -

HALL EFFECT TECHNOLOGY – The description given to the following phenomena: when a semiconductor, through which a current is flowing, is placed in a magnetic field, a difference in potential (voltage) is generated between the two opposed edges of the conductor in the direction mutually perpendicular to both the field and the conductor. Typically used in sensing magnetic fields.

HEAD-ON – A condition whereby the target approaches the sensing face of the proximity sensor with its center along the sensing face.

HERMETICALLY SEALED SWITCH – A switch completely sealed to provide constant operating characteristics. All junctions made with metal-to-metal or glass-to-metal fusion.

HYSTERESIS, SWITCHING – The principle associated with sensors, such that the operate point is not at the same level as the release point. In solid state sensors, it is accomplished electrically. In mechanical switches, it results from the storing of potential energy before the transition occurs.

- I -

INDUCTIVE TECHNOLOGY – Technology based on inductance, the property of an electric circuit by which an electromotive force is induced in it by a variation of current, either 1) in the circuit itself, or 2) in a neighboring circuit.

INPUT – 1) The device or collective set of devices used for bringing data into another device; 2) The signal or stimulus you put into a circuit to make the output of a circuit do something.

INTEGRATED CIRCUIT (IC) – An interconnected array of active and passive elements integrated within a single semiconductor substrate or other compatible material, and capable of performing one complete electronic function.

INTERFACE – A common boundary between electronic systems, or parts of a single system.

INTERFACE CIRCUIT – A circuit that links one type of device with another. Its function is to produce the required current and voltage levels for the next stage of circuitry from the previous stage.

- L -

LEAKAGE CURRENT – Small current flowing through or leaking from the output device in the OFF state due to semiconductor characteristics.

LED (LIGHT EMITTING DIODE) – A solid state light source that emits variable light.

LINEAR (OUTPUT) – Output that is a continuous amplified version of its input. That is, the output is a predetermined variation of its input.

LOAD CURRENT – Units–Amps/milliamps (DC) or Amps RMS/milliamps RMS (AC). The maximum amount of current that a proximity sensor will switch thru its load.

LOGIC – The modification of an input signal that produces delayed, pulsed, latched, or other output response. Logic circuitry is sometimes an integral part of the control, but more often, a separate plug-in card or module.

- M -

MAGNETIC RESPONSIVE CONTROLS – These controls sense through non-ferrous metal. The axis of the magnet should be parallel with the axis of the control. All ferromagnetic material must be at least 0.5 inch (12,7mm) away from the sensing face of the sensor and any part of the sensor.

MAXIMUM LOAD CURRENT – The maximum amount of current that can flow through a sensor and not cause sensor failure.

MOMENTARY SHORT CIRCUIT PROTECTION – Output circuit protection designed to protect the output device from damage due to a temporary (1-3 sec.) short circuit or until an external fuse can interrupt current.

- N -

NOISE, ELECTRICAL – Noise is usually thought of as being the presence of undesirable electrical voltages or currents. It causes devices to operate erratically (if the noise is on the supply line to a device), or produces false information or erratic operation if present on wires carrying signals from the output of a device to the load. Noise can be present in the supply or picked up on lines in many ways. Pick-up from noisy adjacent wires or metal parts is possible. Good wiring practice and/or additional parts can be used to diminish the effects of noise.

NOMINAL SENSING DISTANCE – An approximate dimension value measured from the face of the sensor to the nearest point of the target. It does not take into consideration manufacturer's tolerance or operational variables.

NORMALLY HIGH – A device in which the output is high in voltage in the rest condition.

NORMALLY LOW – A device in which the output is low in voltage in the rest condition.

- O -

OPERATING FORCE (O.F.) – Amount of force applied to switch plunger or actuator to cause contact "snap-over." Note in the case of adjustable actuators, the force is measured from the maximum length position of the lever.

OPERATING POSITION (O.P.) – Position of switch plunger or actuator at which point contacts snap from normal to operated position. Note that in the case of flexible or adjustable actuators, the operating position is measured from the end of the lever or its maximum length.

OUTPUT – The useful energy delivered by a circuit or device. Can mean energy produced at the output terminals of an amplifier – a source of energy.

OVERTRAVEL (O.T.) – Plunger or actuator travel safely available beyond operating position.

Glossary of Terms

- P -

PARALLEL CIRCUIT – A circuit in which current has two or more paths to follow. Two electrical elements are in parallel if both terminals of both elements are electrically connected.

POWER DISSIPATION – Units–Watts/milliwatts (DC) or Volt-Amps (AC). The amount of power that is consumed and converted to heat in normal operation.

Supply Voltage (max)×Supply Current (max)–Power Dissipation
Volts×Amps–Watts (DC) or
Volt/Amps (AC)

PRECISION SNAP-ACTING SWITCH – An electromechanical switch having predetermined and accurately controlled characteristics and having a spring loaded quick make and break contact action.

PRETRAVEL (P.T.) – Distance or angle traveled in moving plunger or actuator from free position to operating position.

- R -

RELEASE FORCE (R.F.) – Amount of force still applied to switch plunger or actuator at moment contacts snap from operated position to unoperated position.

REPEATABILITY – The ability of a sensor to reproduce output readings when the same value is applied to it consecutively in the same direction, for a specified number of cycles, or specified time duration.

RESPONSE TIME – The time it takes for a device to respond to an input signal. The sum of the sensor, amplifier, and output response is the total response time.

REVERSE POLARITY PROTECTION – Circuitry, usually a diode, which prevents current from flowing into the device in case of accidental mis-wiring of the plus (+) and minus (-) terminals, preventing damage to the unit.

RISE TIME – A measure (10% to 90%) of the time required for an output voltage to rise from a state of low voltage level to a high voltage level, once a level change has started.

- S -

SATURATION VOLTAGE – The voltage drop appearing across a control device that is fully turned On.

SENSING DISTANCE – The maximum recommended distance between the sensor and a standard target at which the sensor will effectively and reliably detect th target.

SENSITIVITY – Maximum recommended distance between the sensor and standard target at which sensor will effectively and reliably detect a specific target.

SENSOR – A sensing element. The basic element that usually changes some physical parameter to an electrical signal.

SERIES CIRCUIT – A circuit in which current has only one path to follow.

SHIELDED SENSOR – A sensor which “senses” only to the front of its face and ignores metals to its side. The presence of such side metal, however, may cause a slight shift in operating characteristics.

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.

SLIDE-BY – The condition whereby the target approaches the sensing face of the proximity sensor in such a direction that its center will cross the axis of the sensing face at right angles.

STANDARD TARGET – An object used for making comparative measurements of operating distance. A square of mild steel, 1mm thick. The length of the side of the square is equal to either:

- A) the diameter of the circle inscribed on the active surface of the sensitive face of the sensor, or
- B) three times the rated operating distance, whichever is the greater.

SUPPLY CURRENT – units–Amps or milliams. The amount of current necessary to maintain operation of a proximity sensor or control base. Sometimes referred to as Current Consumption.

SUPPLY VOLTAGE—units–Volts. The range of power required to maintain proper operation of a proximity sensor or control base. The difference in potential (or range of difference in potential) necessary to operate the unit.

SWITCHING FREQUENCY – The frequency at which a sensor is capable of turning On or Off.

- T -

TARGET – The part or piece being detected.

TOTAL TRAVEL (T.T.) – Distance from actuator free position to overtravel limit position.

TRANSIENTS – In electronic usage, usually refers to an unwanted, temporary, large increase or decrease in a current or supply voltage that only occurs occasionally. Almost always due to reactive components during rapid changes in voltage or current.

TRANSIENT PROTECTION – Circuitry to guard against spikes induced on the supply lines by inductive sources such as heavy motors or solenoids turning On and Off.

- U -

UNSHIELDED SENSOR – A sensor with limited side and front sensing capabilities.

- V -

VOLTAGE DROP – Sometimes referred to as Saturation Voltage. In any solid state control that switches a load, there will be some voltage dropped across the output. This voltage drop or saturation voltage will often vary with the amount of current going through the output section and the load. It should be specified with current conditions.