Input Sources

Potentiometers

A potentiometer, or pot, is simply an adjustable electrical resistor that allows the user to change the input voltage to the circuit through a voltage divider. It has a resistive element connected to the circuit by three terminals. One terminal is attached to the minimum voltage, typically ground, while the second is attached to the maximum allowable voltage[1], i.e. 5 V. The third terminal is connected to the input of the circuit, and its position determines the amount of voltage that enters the circuit. The resistive element is effectively divided into two resistors with variable values that are determined by the position of the third terminal. This causes a voltage divider and, therefore, only a percentage of the overall voltage is applied to the circuit.

A potentiometer with a center tap has its zero reference halfway between the minimum and maximum voltages of its controllable range. For example a 0 – 5 V potentiometer (minimum = GND, maximum = 5 V) could have a 2.5 V center tap. In this case 2.5 V = 0, and the control signal would come from the range of –2.5 to +2.5 V.

Since a potentiometer can be viewed as a variable voltage source within a certain range, it is especially useful in proportional control.

Joysticks

When a joystick is used to provide the input signal, the position of the joystick is translated into a control voltage.[2] This voltage then drives the circuit the same way as would input voltages from other sources. What is important to consider when selecting a joystick is the voltage range over which the joystick will operate to ensure that it matches the allowable voltage range(s) of the product with which it will be used. It is also important to consider whether a single- or multi-axis joystick will be connected to drive the circuit.[3] This decision will be made by the user to accommodate system requirements.

When a joystick is used as the circuit driver, the output response of the solenoid will vary depending on how the solenoid is connected to the circuit. Refer to the product specific User Guide for details.

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[1] For Axiomatic products, refer to technical data for an internal reference voltage. For potentiometer control outside that range, connect the potentiometer to an external voltage source.

[2] The means by which this is done is beyond the scope of this document. Refer to literature from your joystick manufacturer for specific details.

[3] A multi-axis joystick can be connected so as to allow only one axis to operate at a time. By using the disable terminal in the Dual Solenoid Driver, operation will be limited to the first axis to be engaged.

Joystick control is especially useful when an equipment operator wants to be able to connect manual movement of the joystick to the response of the system.

Programmable Logic Controllers

Some applications use input signals generated by a programmable logic controller (PLC). A PLC is programmed to make 'intelligent' decisions about what signal should be sent to the board(s) by looking at the inputs and using this information to turn on/off the outputs.

A PLC can generate a wide variety of signals, such as analogue (proportional voltages are analogous to physical variables), digital (physical variables are represented as numbers in the binary system), or PWM. The user should be aware of what type of output the PLC generates, and connect it to a product with the appropriate input requirements. It is also important to check the specifications of the product to ensure that it will not draw more current than can be supplied by the PLC.

The decision of when and where it is appropriate to use a PLC to generate the input signals to drive the board(s) must be made by the user. In general, a PLC will be used in a complex, unpredictable system with many variables where decisions must be made on a continuous basis.