

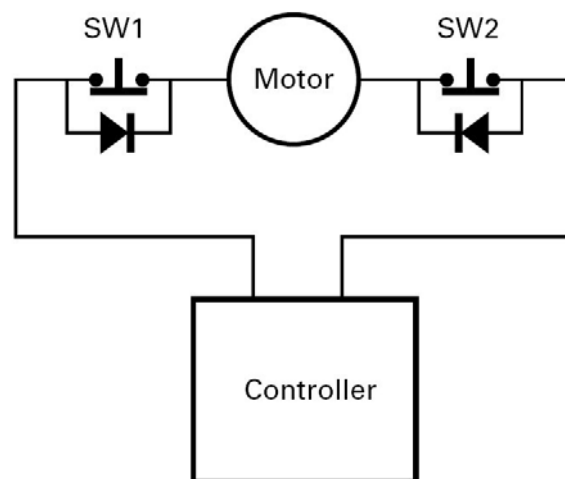
## Adding Safety Limit Switches

The Position mode depends on the position sensor providing accurate position information. If the potentiometer is damaged or one of its wire is cut, the motors may spin continuously in an attempt to reach a fictitious position. In many applications, this may lead to serious mechanical damage.

To limit the risk of such breakage, it is recommended to add limit switches that will cause the motors to stop if unsafe positions have been reached independent of the potentiometer reading.

This wiring can be used whether or not Encoders are used for feedback.

If no Encoder module is present, an alternate method is shown in the picture. This circuit uses Normally Closed limit switches in series on each of the motor terminals. As the motor reaches one of the switches, the lever is pressed, cutting the power to the motor. The diode in parallel with the switch allows the current to flow in the reverse position so that the motor may be restarted and moved away from that limit.



The diode polarity depends on the particular wiring and motor orientation used in the application. If the diode is mounted backwards, the motor will not stop once the limit switch lever is pressed. If this is the case, reverse the diode polarity.

The diodes may be eliminated, but then it will not be possible for the controller to move the motor once either of the limit switches has been triggered.

The main benefit of this technique is its total independence on the controller's electronics and its ability to work in practically all circumstances. Its main limitation is that the switch and diode must be capable of handling the current that flows through the motor. Note that the current will flow through the diode only for the short time needed for the motor to move away from the limit switches.