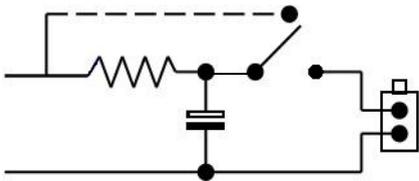


The chief limitation of a solenoid is overheating of the coil. Attempts to get more out of the unit by increasing the current, can lead to burnout (coil failure). On the supply side, there may be a limit to the steady current that can be drawn.

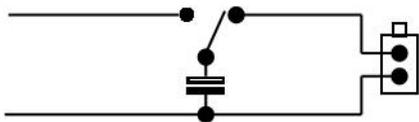
These limitations can often be overcome by a capacitor pulse circuit, which can give the solenoid a high performance with a low current drain on the supply.



(a) Capacitor Pulse, Continuous Hold

An electrolytic capacitor is charged from the supply (DC, full or half-wave rectified AC) when switched to the solenoid - which has a low-resistance coil - the current surge can give the closing force of a highly up-rated coil.

Once closed, the load can be held by a very low current, limited by the resistor to the required value. If rapid re-closing is required, the delay caused by recharging the capacitor through the resistor can be eliminated by using a charge-over switch to bypass the resistor.



(b) Capacitor Pulse, Momentary Hold

In this circuit the resistor is left out, and the capacitor switched either to the supply or to the solenoid. This way, the solenoid closes and then drops out as the pulse dies, irrespective of switch position. This can be useful safety feature where it is important that the solenoid shall *not* hold in, whatever the operator may do with the control button.

Note that the solenoid is at not time directly connected to the supply; this is sometimes counted as an additional safety feature.

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Delaying Opening. If the circuit is so arranged that the capacitor discharge continues after the solenoid has closed, this will give a 'dwell' before dropout. The delay can be controlled by the choice of the coil resistance and value of the capacitor.

Soft Closing. Although a capacitor can give rapid and powerful closing, it can also be used to give the opposite effect. With a suitably chosen coil resistance and capacitance, a solenoid can be made to close gently, the fading pulse of the capacitor counteracting the natural rise of the force curve.

This applies to both the circuits.