



## RC POWER DRIVER INFORMATION

### Background

Solenoid valves are subject to a wide variety of temperature ranges.

Although our valve design allows for continuous duty cycles, solenoids normally require more power to energize than to maintain energized; resulting in the solenoid coils getting hot when continuously left energized at the initial (rated) voltage.

Even at colder ambient temperatures, the inherent nature of Teflon is such that under pressure it may "COLD-FLOW", potentially resulting in valve body distortion and loosened retaining screws.

### Overheating

Due to continuous energization at rated voltage, heat from the solenoid is conducted to the Teflon body.

The different coefficients of expansion of the Teflon, Steel and Stainless Steel will increase the possibility of premature valve failure.

Since the Teflon body is held compressed by 2 screws (in our simplest models), expansion/contraction occurs radically, deforming the body, diaphragms and subsequently the valve seats.

Sometimes as the heat is taken away, the Teflon body regains its original dimensions, sometimes permanent deformation occurs. Retaining screws may also become loose.

### Remedy

Under such circumstances, we recommend heat-sinking the solenoid portion of the valve. Either add Aluminum heat sinks or mount the valve through the solenoid mounting holes onto the chassis of the instrument to enable heat dissipation.

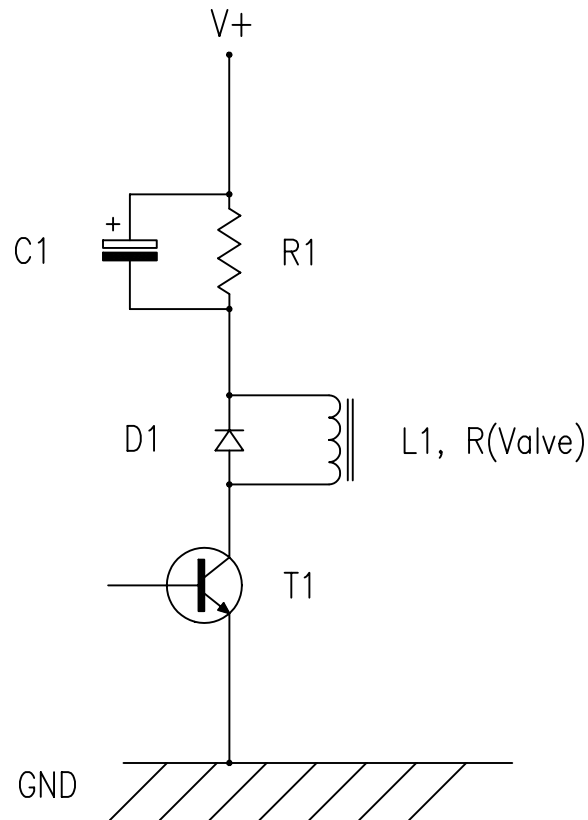
Another often-used method and one that we prefer to recommend is powering the valves on at rated voltage and then decreasing the supply voltage to a level what we call a "HOLDING VOLTAGE".

Assume a 12VDC valve is energized at its rated voltage. After a so-called "response time", the valve changes its state. As soon as this occurs, it is safe to go to a voltage of about one-third of the rated voltage (4VDC, or higher).

Note that the valve is designed to maintain its changed state even at this low holding voltage due to its efficient coil design and characteristics; and the valve will then run cool indefinitely.

Attached drawing UKSP9810B shows one such simple RC circuit with a Resistor and Capacitor in parallel with each other and this RC is connected to one leg of the flying leads of the valve. The cost of the RC circuit is insignificant compared to the benefits of not having to purchase unnecessary replacement valve(s) and also avoiding potentially harmful heat transfer to the media. Please note that the method shown is only one of many that could be used, however please avoid using certain PWM designs as the possible vibration may cause damage to the valve seats.

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The T1 Semiconductor may be replaced by a suitable relay.  
Depending on the Valve model the Coil Type (Volts) may or may not be the same value as the Rated Valve Voltage.  
The recommended voltage rating for C1 is equal or higher than V+.  
Extreme care needs to be taken while selecting the appropriate power rating for R1 resistor, as it may be several Watts!  
The C1 values are recommended minimum values. Under certain circumstances significantly higher C1 values may be required.  
Please allow long enough deenergized periods before each reenergizing for the capacitor to be able to discharge.  
Please do your own evaluation under real working conditions before making final design decisions based on these values.

R1-C1 VALUES FOR EACH VALVE COIL					
COIL SIZE	COIL TYPE	COIL LEAD WIRES	R(Valve)	R1	C1
Valve Series	Volts	Color	Ohms	Ohms	uFarads
161	6	White	26.5	51	2200
161	9	White/Yellow	60	120	1000
161	12	Yellow	127	240	560
161	15	Yellow/Blue	288	560	220
161	24	Blue	500	1k	150
225	6	White	23	47	2700
225	9	White/Yellow	53	100	1500
225	12	Yellow	90	180	820
225	15	Yellow/Blue	137	270	470
225	18	Yellow/Green	160	300	470
225	24	Blue	345	680	220
225	115	Red	5200	10k	15
360	12	Yellow	34	68	2700
360	15	Yellow/Blue	80	150	1200
360	24	Blue	140	270	680
360	115	Red	1925	3k9	47
648	12	Yellow	20	39	8200
648	15	Yellow/Blue	28	56	5600
648	24	Blue	78	150	2200
648	115	Red	1919	3k9	82

Scale	NA	Material	NA
Dr. by	G. Stevens	Approved by	A. Sule
Rev. by	F. Tarnok	Date	19-Jan-07
Part Name		Drawing Number	
.Voltage Dropper		.UKSP9810B	



Drawing Number  
.UKSP9810B