

Electromechanical vs. Solid State Relay Characteristics Comparison

	Characteristics	EMR	SSR
General	Sensitivity to withstand misuse or misapplication	Good	Poor
	Sensitive to corrosion, oxidation, or contaminants	Yes	No
	Sensitive to shock, vibration or acceleration	Yes	No
	Sensitivity to radiation	Fair	Poor
	Package versatility	Good	Fair
	Cost per pole	Best	Fair
	Input TTL & CMOS (buffer) compatibility	Fair	Best
	Operate and release time	5-20 mS	.25-10 mS
	Compatibility of military/aerospace specs.	Good	Poor
	Ease of troubleshooting	Good	Poor
	Input to output isolation capability	4Kv	>4Kv
	Normal failure mode (output)	Open	Shorted
	Normal wearout mechanism	Contacts	LED
*Output Switching Capabilities	Physical size per pole	Best	Fair
	Available output contact forms	1A, 1B, 1C	1A, 1C, 2A, 4A
	Multipole capability from single input	Yes	Some
	Electrical life expectancy (operations)	>100K	>100 Million
	Capable of rapid duty cycle switching	Some	All
	Capable of AC & DC voltage switching	Yes	Some
	Capable of inductive load switching	Yes	Yes
	Capable of resistive load switching	Yes	Yes
	Capable of capacitive load switching	Yes	Yes
	Capable of low level load switching	Yes	Some
	Capable of dry circuit load switching	Yes	No
	Capable of coaxial load (RF) switching	Yes	No
	Capable of precision synchronous switching	No	Yes
	Capable of zero voltage turn-on/zero current turn-off	No	Yes
	Output contact off-state resistance	>1 M ohms	>20K ohms
	Output contact on-state resistance	<.05 ohms	<.1 ohms
	Output contact arcing	Yes	No
	Output contact bounce	Yes	No
	Level of EMI/RFI generated (emitted)	Large	Small
	Derating of output current required above $T_A=25^{\circ}\text{C}$	No	Yes
	Heatsink required to switch maximum rated loads	No	Some
	Inrush surge current capability (ref. to max. rated current)	1-5 times	2-10 times
	On-state surge current capability (ref. to max. rated current)	1-5 times	2-10 times
	Sensitive to explosive environment	Yes	No
	Sensitivity to magnetic fields	Fair	Good
	Sensitive (susceptibility) to EMI/RFI false operation	No	Yes
	Sensitive to ESD (electrostatic discharge) turn-on	No	Yes
	Sensitive to overvoltage turn-on	No	Yes
	Sensitive to thermal turn-on	No	Yes
	Sensitive to dv/dt turn-on	No	Yes
	Sensitive to load di/dt turn-on	No	Yes

*Ability is highly application dependent