Pickering Reed Relay Finder - 2022

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Application	High Density Vertical														
Series Name	124-1-A	122-1-A	120-1-A		117-1-A	117-2-A	116-1-A	116-2-A	115-1-A		115-2-A		112-1-A	110-1-A	
Physical Outline	4mm^2 ™	4mm^2 ™	4mm^2 ™												
Features	Highest Quality Instrumentation Grade Reed Switches Ultra High Packing Density												High Packing Density		
Dimensions mm (inches): Depth	3.9 (0.153)	3.9 (0.153)	3.9 (0.153)		3.7 (0.145)		3.7 (0.145)		3.7 (0.145)				3.7 (0.145)	3.7 (0.145)	
Width	3.9 (0.153)	3.9 (0.153)	3.9 (0.153)		6.6 (0.26)	9.9 (0.39)	6.6 (0.26)	9.9 (0.39)	6.6 (0.26)		9.9 (0.39)		10.0 (0.395)	10 (0.39)	
Height	9.5 (0.375)	12.5 (0.49)	15.5 (0.61)		9.52 (0.375)		12.45 (0.49)		15.5 (0.61)				11.0 (0.43)	15.2 (0.6)	
Footprint (0.1 inch grid)															
Contact Configuration	1A (SPST)	1A (SPST)	1A (SPST)		1A (SPST)	2A (DPST)	1A (SPST)	2A (DPST)	1A (SPST)		2A (DPST)		1A (SPST)	1A (SPST)	
Switch Schematic															
Reed Switch Type	Low Level Dry Reed	Low Level Dry Reed	General Dry Reed	Low Level Dry Reed	Low Level Dry Reed		Low Level Dry Reed		General Dry Reed	Low Level Dry Reed	General Dry Reed	Low Level Dry Reed	Low Level Dry Reed	General Dry Reed	Low Level Dry Reed
Switch Number	2	2	1	2	2		2		1	2	1	2	2	1	2
Diode Available	No	No	No		Yes		Yes		Yes				Yes	Yes	
Switching Voltage/V	170 V	200 V	200 V		170 V		200 V		200 V				200 V	200 V	
Switching Current/A	0.5 A	0.5 A	1.0 A	0.5 A	0.5 A		0.5 A		1.0 A	0.5 A	1.0 A	0.5 A	0.5 A	1.0 A	0.5 A
Carry Current/A	0.5 A	0.5 A	1.2 A		0.5 A		0.5 A		1.2 A	1.2 A	1.2A	1.2 A	0.5 A	1.2 A	
Switch Power/W	10 W	10 W	15(3V), 20	10 W	10 W		10 W		15(3V), 20	10 W	15 W	10 W	10 W	20 W	10 W
Max Initial Contact Resistance/mΩ	180 mΩ	180 mΩ	180 mΩ		120 mΩ		120 mΩ		120 mΩ				120 mΩ	150 mΩ	120 mΩ
Life Expectancy/operations: Min Load	2.5 x 10^{8}	2.5 x 10^{8}	10^{9}		2.5 x 10^{8}		2.5 x 10^{8}		10^{9}				10^{9}	10^{9}	
Typical	10^{7}	10^{7}	10^{8}		10^{7}		10^{7}		10^{8}				10^{7}	10^{8}	
Max Load	10^{6}	10^{6}	10^{7}		10^{6}		10^{6}		10^{7}				10^{6}	10^{7}	
Operate Time/ms	0.2 ms	0.2 ms	0.5 ms		0.3 ms		0.5 ms		0.5 ms				0.5 ms	0.5 ms	
Release Time/ms	0.1 ms	0.1 ms	0.2 ms		0.15 ms		0.2 ms		0.2 ms				0.2 ms	0.2 ms	
Insulation Resistance/Ω	10^{12} Ω	10^{12} Ω	10^{12} Ω		10^{12} Ω		10^{12} Ω		10^{12} Ω				10^{12} Ω	10^{12} Ω	
Coil Resistance: 3V/Ω	75 Ω	125 Ω	200 Ω	200 Ω	200 Ω	–	250 Ω	–	250 Ω		–	–	250 Ω	–	250 Ω
5V/Ω	200 Ω	350 Ω	300 Ω	500 Ω	400 Ω	250 Ω	500 Ω	375 Ω	500 Ω		250 Ω	375 Ω	500 Ω	500 Ω	
12V/Ω	–	–	800 Ω	800 Ω	–		750 Ω	750 Ω	1000 Ω		750 Ω	750 Ω	750 Ω	1000 Ω	
24V/Ω	–	–	–	–	–		–		–		–	–	–	–	–

Application	Plastic Package SIL																						
Series Name	113-1-A	113SP-1-A	113-2-A	113-1-C	111P-1-A	109P-1-A		106-1-A		106-1-C	105-1-A					105-1-C	105-1-B		105-2-A			103-1-A & 103M-1-A	
Physical Outline																							
Features	Highest Quality Instrumentation Grade Reed Switches High Packing Density			Smallest Form C	High Packing Density			Standard 0.2" Pitch			Wide Range of Configurations											Low Capacitance	
Dimensions mm (inches): Depth	3.7 (0.145)				3.7 (0.145)	3.7 (0.145)		4.8 (0.19)			6.6 (0.26)											4.8 (0.19)	
Width	12.5 (0.49)				10.0 (0.39)	15.1 (0.595)		19.1 (0.75)			19.1 (0.75)											19.1 (0.75)	
Height	6.6 (0.26)		8.9 (0.35)	6.6 (0.26)	6.6 (0.26)	6.6 (0.26)		8.1 (0.32)			7.9 (0.31)						10.7 (0.42)					8.1 (0.32)	
Footprint (0.1 inch grid)																							
Contact Configuration	1A (SPST)	1A (SPST)	2A (DPST)	1C (SPDT)	1A (SPST)	1A (SPST)		1A (SPST)		1C (SPDT)	1A (SPST)					1C (SPDT)	1B (SPNC)		2A (DPST)			1A (SPST)	
Switch Schematic																							
Reed Switch Type	Low Level Dry Reed			Dry Reed	General Dry Reed	General Dry Reed	Low Level Dry Reed	General Dry Reed	Low Level Dry Reed	Dry Reed	General Dry Reed	Low Level Dry Reed	High Voltage Switch	Standard Mercury Switch	Position Insensitive Switch	Dry Reed	General Dry Reed	Low Level Dry Reed	General Dry Reed	Low Level Dry Reed	Standard Mercury Switch	General Dry Reed	Low Level Dry Reed
Switch Number	2			3	1	1	2	1	2	3	1	2	4	6	8	3	1	2	1	2	6	1	2
Diode Available	Yes				Yes	Yes		Yes			Yes											Yes	
Switching Voltage/V	200 V			30 V	170 V	200 V		200 V			200 V		500 V			200 V					500 V	200 V	
Switching Current/A	0.5 A			0.1 A	0.5 A	1.0 A	0.5 A	1.0 A	0.5 A	0.25 A	1 A	0.5 A	0.5 A	2 A	2 A	0.25 A	1 A	0.5 A	1 A	0.5 A	2 A	1 A	0.5 A
Carry Current/A	0.5 A			0.1 A	0.5 A	1.2 A		1.2 A			1.2 A			3 A	3 A	1.2 A					3 A	1.2 A	
Switch Power/W	10 W			2 W	10 W	15(5L), 20	10 W	20 W	10 W	3 W	15(3V), 20	10 W	10 W	50 W	50 W	3 W	15(5V), 20	10 W	15(5V), 20	10 W	50 W	15 W	10 W
Max Initial Contact Resistance/mΩ	120 mΩ			250 mΩ	150 mΩ	150 mΩ	120 mΩ	150 mΩ	120 mΩ	200 mΩ	150 mΩ	120 mΩ	150 mΩ	75 mΩ	100 mΩ	200 mΩ	150 mΩ		170 mΩ	150 mΩ	100 mΩ	150 mΩ	120 mΩ
Life Expectancy/operations: Min Load	2.5 x 10^{8}			2.5 x 10^{8}	2.5 x 10^{8}	10 x 10^{9}		10^{9}		10^{8}	10^{9}		10^{8}	10^{9}		10^{8}	10^{9}					10^{9}	
Typical	10^{7}			10^{7}	10^{7}	10^{8}		10^{8}		10^{7}	10^{8}		10^{7}	10^{8}		10^{7}	10^{8}					10^{8}	
Max Load	10^{6}			10^{6}	10^{6}	10^{7}		10^{7}		10^{6}	10^{7}		10^{6}	10^{7}		10^{6}	10^{7}					10^{7}	
Operate Time/ms	0.5 ms			1 ms	0.5 ms	0.5 ms		0.5 ms		1 ms	0.5 ms		0.75	1.5 ms	1.5 ms	1 ms	0.5 ms				1.5 ms	0.5 ms	
Release Time/ms	0.2 ms			0.2 ms	0.2 ms	0.2 ms		0.2 ms		0.5 ms	0.2 ms		0.5	1 ms	1 ms	0.5 ms	0.2 ms				1 ms	0.2 ms	
Insulation Resistance/Ω	10^{12} Ω			10^{10} Ω	10^{12} Ω	10^{12} Ω		10^{12} Ω		10^{10} Ω	10^{12} Ω			10^{11} Ω		10^{10} Ω	10^{12} Ω				10^{11} Ω	10^{12} Ω	
Coil Resistance: 3V/Ω	250 Ω	–	–	–	200 Ω	–	250 Ω	–	500 Ω	–	500 Ω	500 Ω	–	–	–	–	–		–	–	–	–	–
5V/Ω	500 Ω		150 Ω	150 Ω	400 Ω	500 (1000 for high sensitivity version)		500 Ω			500 Ω			140 Ω		500 Ω	1000 Ω		500 Ω		100 Ω	150 Ω	
12V/Ω	650 Ω		–	–	–	1000		1000 Ω			1000 Ω			500 Ω		1000 Ω	3000 Ω		1000 Ω		375 Ω	–	–
24V/Ω	–	–	–	–	–	–	–	–	–	–	3000 Ω			1500 Ω		3000 Ω	3000 Ω		3000 Ω		1000 Ω	–	–

Application	Metal Package SIL																						
Series Name	111-1-A	109-1-A		109-1-C	109-1-B	109-2-A	108-1-A		108-1-C	108-2-A		107-1-A					107-1-C	107-1-B		107-2-A			107-2-C
Physical Outline																							
Features	Highest Quality Instrumentation Grade Reed Switches SoftCenter™ Construction in Mu-Metal Can																						
Dimensions mm (inches): Depth	3.7 (0.145)	3.7 (0.145)					3.7 (0.145)					4.8 (0.19)											
Width	10.0 (0.39)	15.1 (0.595)					20.0 (0.79)					19.1 (0.75)											24.1 (0.95)
Height	6.6 (0.26)	6.6 (0.26)			8.9 (0.35)		6.6 (0.26)			8.9 (0.35)		7.6 (0.3)						10.2 (0.4)					
Footprint (0.1 inch grid)																							
Contact Configuration	1A (SPST)	1A (SPST)		1C (SPDT)	1B (SPNC)	2A (DPST)	1A (SPST)		1C (SPDT)	2A (DPST)		1A (SPST)					1C (SPDT)	1B (SPNC)		2A (DPST)			2C (DPDT)
Switch Schematic																							
Reed Switch Type	General Dry Reed	General Dry Reed	Low Level Dry Reed	Dry Reed	Low Level Dry Reed		General Dry Reed	Low Level Dry Reed	Dry Reed	General Dry Reed	Low Level Dry Reed	General Dry Reed	Low Level Dry Reed	High Voltage Switch	Standard Mercury Switch	Position Insensitive Switch	Dry Reed	General Dry Reed	Low Level Dry Reed	General Dry Reed	Low Level Dry Reed	Standard Mercury Switch	Dry Reed
Switch Number	1	1	2	3	2		1	2	3	1	2	1	2	4	6	8	3	1	2	1	2	6	3
Diode Available	Yes	Yes					Yes					Yes											
Switching Voltage/V	170 V	200 V		30 V	200 V		200 V					200 V		400 V	500 V	500 V	200 V					500 V	200 V
Switching Current/A	0.5 A	1 A	0.5 A	0.1 A	0.5 A		1 A	0.5 A	0.25 A	1 A	0.5 A	1 A	0.5 A		2 A	2 A	0.25 A	1 A	0.5 A	1 A	0.5 A	2 A	0.25 A
Carry Current/A	0.5 A	1.2 A		0.1 A	1.2 A		1.2 A					1.2 A			3 A	3 A	1.2 A					3 A	1.2 A
Switch Power/W	10 W	15(5L), 20	10 W	2 W	10 W		20 W	10 W	3 W	15(5V), 20	10 W	15(3V), 20	10 W		50 W	50 W	3 W	15(5V), 20	10 W	15(5V), 20	10 W	50 W	3 W
Max Initial Contact Resistance/mΩ	150 mΩ	150 mΩ	120 mΩ	250 mΩ	120 mΩ	140 mΩ	150 mΩ	120 mΩ	200 mΩ	170 mΩ	150 mΩ	150 mΩ	120 mΩ	150 mΩ	75 mΩ	100 mΩ	200 mΩ	150 mΩ		170 mΩ	150 mΩ	100 mΩ	220 mΩ
Life Expectancy/operations: Min Load	2.5 x 10^{8}	10^{9}		10^{8}	10^{9}		10^{9}		10^{8}	10^{9}		10^{9}		10^{8}	10^{9}		10^{8}	10^{9}					10^{8}
Typical	10^{7}	10^{8}		10^{7}	10^{8}		10^{8}		10^{7}	10^{8}		10^{8}		10^{7}	10^{8}		10^{7}	10^{8}					10^{7}
Max Load	10^{6}	107		10^{6}	10^{7}		10^{7}		10^{6}	10^{7}		10^{7}		10^{6}	10^{7}		10^{6}	10^{7}					10^{6}
Operate Time/ms	0.5 ms	0.5 ms		0.75 ms	0.5 ms		0.5 ms		1 ms	0.5 ms		0.5 ms		0.75	2 ms		1 ms	0.5 ms				2 ms	1 ms
Release Time/ms	0.2 ms	0.2 ms		0.5 ms	0.2 ms		0.2 ms		0.5 ms	0.2 ms		0.2 ms		0.5 ms	1.25 ms		0.5 ms	0.2 ms				1.25 ms	0.5 ms
Insulation Resistance/Ω	10^{12} Ω	10^{12} Ω		10^{11} Ω	10^{12} Ω		10^{12} Ω		10^{10} Ω	10^{12} Ω		10^{12} Ω			10^{11} Ω		10^{10} Ω	10^{12} Ω				10^{11} Ω	10^{10} Ω
Coil Resistance: 3V/Ω	200 Ω	–	330 Ω	100 Ω	–	200 Ω	–	330 Ω	–	–	–	500 Ω	500 Ω	–	–	–	–	–		–	–	–	200 Ω
5V/Ω	500 Ω	500 (1000 for high sensitivity version)		150 Ω	750 Ω	375 Ω	500 Ω			375 Ω		500 Ω			140 Ω		500 Ω	1000 Ω		500 Ω	500 Ω	100 Ω	375 Ω
12V/Ω	–	1000 Ω		–	–	750 Ω	1000 Ω			1000 Ω		1000 Ω			500 Ω		1000 Ω	3000 Ω		1000 Ω	1000 Ω	375 Ω	1000 Ω
24V/Ω	–	–	–	–	–	–	–	–	–	–	–	3000 Ω			1500 Ω		3000 Ω	3000 Ω		3000 Ω	3000 Ω	1000 Ω	2700 Ω

Application	High Switching Power					
Series Name	114-1-A	114-2-A	114-1-B	100HC-1-A	100HC-2-A	100HC-1-B
Physical Outline				New		
Features	Highest Quality Instrumentation Grade Reed Switches High Power					
Dimensions mm (inches): Depth	6.3 (0.245)			10.2 (0.40)		
Width	24.1 (0.95)	29.0 (1.14)		24.1 (0.95)	29.0 (1.14)	
Height	8.2 (0.32)	12.5 (0.49)		12.7 (0.50)	15.2 (0.60)	
Footprint (0.1 inch grid)						
Contact Configuration	1A (SPST)	2A (DPST)	1B (SPNC)	1A (SPST)	2A (DPST)	1B (SPNC)
Switch Schematic						
Reed Switch Type	High Power Dry Reed			High Power Dry Reed		
Switch Number	1			1		
Diode Available	Yes			Yes		
Switching Voltage/V	200Vdc 240Vac (500V min stand off)			200Vdc 240Vac (500V min stand off)		
Switching Current/A	1 A			1 A		
Carry Current/A	3 A			3 A		
Switch Power/W	40 W			40 W		
Max Initial Contact Resistance/mΩ	150 mΩ	250 mΩ	200 mΩ	200 mΩ	250 mΩ	200 mΩ
Life Expectancy/operations: Min Load	10^{9}			10^{9}		
Typical	10^{8}			10^{8}		
Max Load	10^{7}			10^{7}		
Operate Time/ms	1 ms			2 ms		
Release Time/ms	0.5 ms			1 ms		
Insulation Resistance/Ω	10^{12} Ω			10^{12} Ω		
Coil Resistance: 3V/Ω	75 Ω	–	–	–	–	–
5V/Ω	250 Ω	150 Ω	350 Ω	500 Ω	300 Ω	300 Ω
12V/Ω	750 Ω	350 Ω	1000 Ω	2000 Ω	1000 Ω	1000 Ω
24V/Ω	2000 Ω	1000 Ω	2200 Ω	6000 Ω	4000 Ω	4000 Ω

Custom Reed Relays

Pickering may be able to adapt an existing relay or design a special part to suit your needs. Some examples are below:

- Standard parts with custom pinouts or pin length
- Specialized Applications, for example, current operated relays
- Copper plated switches for RF/HF applications
- 1 and 2 Form A available
- Standard Catalog parts tested to a higher spec. For example, the Series 104 has been modified for applications requiring an increased voltage
- 2-Pole Mercury Wet relay with custom pinout, an equivalent to a competitor's discontinued part
- 2-Pole Mercury Wet Changeover relay where a common open time is required

Help with your Custom Requirements

Go to: pickeringrelay.com/reed-relays/custom-reed-relays

If your questions are not answered there please call **+44 (0) 1255 428141** or e-mail: techsales@pickeringrelay.com

For a **free evaluation sample** call technical sales on +44 (0) 1255 428141, or e-mail sales@pickeringrelay.com

Application	High Voltage																						
Series Name	131-1-A		119-1-A					119-2-A		119-1-B			106-1-A	104-1-A					104-1-B		104-2-A		
Physical Outline	New													New									
Features	Highest Quality Instrumentation Grade Reed Switches High Voltage																						
Dimensions mm (inches): Depth	3.7 (0.145)		3.7 (0.145)							3.7 (0.145)			4.8 (0.19)	6.3 (0.245)									
Width	12.5 (0.49)		15.1 (0.595)					20.1 (0.79)		15.1 (0.595)			19.1 (0.75)	24.1 (0.95)					29 (1.14)				
Height	6.6 (0.26)		6.6 (0.26)					8.9 (0.35)		8.9 (0.35)			8.1 (0.32)	8.2 (0.32)					12.5 (0.49)				
Footprint (0.1 inch grid)																							
Contact Configuration	1A (SPST)		1A (SPST)					2A (DPST)		1B (SPNC)			1A (SPST)	1A (SPST)					1B (SPNC)		2A (DPST)		
Switch Schematic																							
Reed Switch Type	1kV Min Stand Off	1.5kV Min Stand Off	1kV Min Stand Off	1.5kV Min Stand Off		2kV Min Stand Off	3kV Min Stand Off	1kV Min Stand Off	1.5kV Min Stand Off	1kV Min Stand Off	1.5kV Min Stand Off	2kV Min Stand Off	1.5kV Min Stand Off	1.5kV Min Stand Off	2kV Min Stand Off	1.5kV Min Stand Off (Mercury)	3kV Min Stand Off	4kV Min Stand Off	1.5kV Min Stand Off	2kV Min Stand Off	1.5kV Min Stand Off	2kV Min Stand Off	1.5kV Min Stand Off (Mercury)
Switch Number	1 (L)	1	1 (L)	1	2 (L)	2	3	1 (L)	1	1 (L)	1	2	5	1	2	6	3	4	1	2	1	2	6
Diode Available	Yes		Yes										Yes	Yes									
Switching Voltage/V	1000 V		1000 V										500 V	1000 V	1000 V	500 V	1000 V		1000 V	1000 V	500 V	1000 V	500 V
Switching Current/A	0.7 A		0.7 A										0.5 A	1 A		2 A	1 A		1 A				2 A
Carry Current/A	1.25 A		1.25 A										1.2 A	1.5 A		3 A	1.5 A		1.5 A				3 A
Switch Power/W	10 W		10 W										10 W	25 W		50 W	25 W		25 W				50 W
Max Initial Contact Resistance/mΩ	170 mΩ		170 mΩ										150 mΩ	150 mΩ		120 mΩ	150 mΩ		200 mΩ				150 mΩ
Life Expectancy/operations: Min Load	10^{8}		10^{9}										10^{9}	10^{9}									
Typical	-		10^{8}										10^{8}	10^{8}									
Max Load	10^{7}		10^{7}										10^{7}	10^{7}									
Operate Time/ms	0.5 ms		0.5 ms										0.5 ms	1 ms		1.5 ms	1 ms						1.5 ms
Release Time/ms	0.2 ms		0.2 ms										0.2 ms	0.3 ms		1 ms	0.3 ms						1 ms
Insulation Resistance/Ω	10^{12} Ω		10^{12} Ω										10^{12} Ω	10^{12} Ω		10^{11} Ω	10^{12} Ω		10^{12} Ω	10^{12} Ω	10^{12} Ω	10^{12} Ω	10^{11} Ω
Coil Resistance: 3V/Ω	100 Ω		100 Ω	100 Ω	50 Ω	75 Ω	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω	-	–		–	–		–		–	–	–
5V/Ω	250 Ω		250 Ω	250 Ω	125 Ω	200 Ω	125 Ω	100 Ω	100 Ω	100 Ω	100 Ω	100 Ω	375 Ω	375 Ω		100 Ω	220 Ω		750 Ω		250 Ω		50 Ω
12V/Ω	750 Ω		750 Ω	750 Ω	400 Ω	500 Ω	400 Ω	400 Ω	400 Ω	400 Ω	400 Ω	400 Ω	1000 Ω	1000 Ω		500 Ω	500 Ω		2000 Ω		750 Ω		275 Ω
24V/Ω	–		–	–	–	–	–	–	–	–	–	–	-	3000 Ω		1500 Ω	3000 Ω		3000 Ω		2000 Ω		1000 Ω

Application	High Voltage																						
Series Name	100HV-1-A			100HV-1-B		100HV-2-A		62/63-1-A			62/63-1-B		60/65-1-A			60/65-1-B		67-1-A			67-1-C	68-1-A	
Physical Outline	New																				NEW		
Features	Highest Quality Instrumentation Grade Reed Switches High Voltage							Robust Tungsten Plated Switches															
Dimensions mm (inches): Depth	10.2 (0.40)							19.05 (0.75)					16.0 (0.63)					12.6 (0.495)					
Width	24.1 (0.95)			29.0 (1.14)				63.5 (2.5)					57.9 (2.28)					58.4 (2.3)					
Height	12.7 (0.50)			15.2 (0.60)				21.3 (0.84)					18.0 (0.71)					14.5 (0.57)					
Footprint (0.1 inch grid)								Scaled 50%					Scaled 50%					Scaled 50%					
Contact Configuration	1A (SPST)			1B (SPNC)		2A (DPST)		1A (SPST)			1B (SPNC)		1A (SPST)			1B (SPNC)		1A (SPST)			1C (SPDT)	1A (SPST)	
Switch Schematic																							
Reed Switch Type	1.5kV Min Stand Off	2kV Min Stand Off	3kV Min Stand Off	1.5kV Min Stand Off	2kV Min Stand Off	1.5kV Min Stand Off	2kV Min Stand Off	5kV Stand Off	10kV Stand Off	15kV Stand Off	5kV Stand Off	10kV Stand Off	5kV Stand Off	10kV Stand Off	15kV Stand Off	5kV Stand Off	10kV Stand Off	5kV Stand Off	10kV Stand Off	8kV Stand Off	5kV Stand Off	5kV Stand Off	10kV Stand Off
Switch Number	1	2	3	1	2	1	2	1	2	3	1	2	1	2	3	1	2	1	2	4	5	1	2
Diode Available	Yes							No					No					Yes					
Switching Voltage/V	1000 V							3500 V	7500	12500	3500 V	7500 V	3500	7500	12500	3500 V	7500 V	3500 V	7500 V	6000 V	2500 V	3500 V	7500 V
Switching Current/A	1 A							3 A					3 A					3 A			3 A	3 A	
Carry Current/A	1.5 A							3.5 A					3.5 A					3.5 A	3.5 A	5 A	3.2 A	3.5 A	
Switch Power/W	25 W							50 W					50 W					50 W	50 W	200 W	100 W	50 W	
Max Initial Contact Resistance/mΩ	150 mΩ			200 mΩ				120 mΩ					120 mΩ					120 mΩ		500 mΩ	500 mΩ	120 mΩ	
Life Expectancy/operations: Min Load	10^{9}							10^{8}					10^{8}					10^{8}			10^{8}	10^{8}	
Typical	10^{8}							10^{7}					10^{7}					10^{7}			10^{7}	10^{7}	
Max Load	10^{7}							10^{6}					10^{6}					10^{6}			10^{6}	10^{6}	
Operate Time/ms	2 ms							3 ms					3 ms					3 ms		6 ms	4 ms	3 ms	
Release Time/ms	1 ms							2 ms					2 ms					2 ms			4 ms	2 ms	
Insulation Resistance/Ω	10^{12} Ω							10^{12} Ω					10^{12} Ω					10^{12} Ω		10^{10} Ω	10^{10} Ω	10^{12} Ω	
Coil Resistance: 3V/Ω	–	–	–	–	–	–	–	–	–	–			–	–	–			–			–	–	
5V/Ω	2200 Ω	1000 Ω	500 Ω	500 Ω	500 Ω	500 Ω	500 Ω	50 Ω	25 Ω	50 Ω			35 Ω	20 Ω	35 Ω			40 Ω			40 Ω	40 Ω	
12V/Ω	6800 Ω	3300 Ω	2000 Ω	2500 Ω	2000 Ω	2500 Ω	2000 Ω	150 Ω	75 Ω	150 Ω			150 Ω	50 Ω	150 Ω			150 Ω			150 Ω	150 Ω	
24V/Ω	6800 Ω	6800 Ω	6800 Ω	6000 Ω	4000 Ω	6000 Ω	4000 Ω	500 Ω	350 Ω	500 Ω			500 Ω	200 Ω	500 Ω			600 Ω			600 Ω	600 Ω	

Application	Coaxial/RF/High Speed Digital Reed Relays													
Series Name	111RF-1-A	113RF-1-A	109RF50-1-A		109RF75-1-A		103G-1-A		103GM-1-A		102M-1-A		102M-1-B	
Physical Outline		NEW												
Features	Highest Quality Instrumentation Grade Reed Switches SoftCenter™		SoftCenter™ Construction in Mu-Metal Can				Low Capacitance				Up to 20W Switching			
Dimensions mm (inches): Depth	3.7 (0.145)	3.7 (0.145)	3.7 (0.145)				4.8 (0.19)				4.8 (0.19)			
Width	10.0 (0.39)	12.5 (0.49)	15.1 (0.595)				19.1 (0.75)				19.1 (0.75)			
Height	6.6 (0.26)	6.6 (0.26)	6.6 (0.26)				8.1 (0.32)				7.6 (0.3)		10.2 (0.4)	
Footprint (0.1 inch grid)														
Contact Configuration	1A (SPST)	1A (SPST)	1A (SPST)				1A (SPST)		1A (SPST)		1A (SPST)		1B (SPNC)	
Switch Schematic														
Reed Switch Type	General Dry Reed	General Dry Reed	General Dry Reed	Low Level Dry Reed	General Dry Reed	Low Level Dry Reed	General Dry Reed	Low Level Dry Reed	General Dry Reed	Low Level Dry Reed	General Dry Reed	Higher Power Dry Reed	General Dry Reed	Higher Power Dry Reed
Switch Number	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Diode Available	Yes	Yes	Yes				Yes				Yes			
Switching Voltage/V	170 V	200 V	200 V				200 V		200 V		200 V			
Switching Current/A	0.5 A	0.5 A	1 A	0.5 A	1 A	0.5 A	1 A	0.5 A	1 A	0.5 A	0.5 A	1 A	0.5 A	1 A
Carry Current/A	0.5 A	0.5 A	1.2 A				1.2 A		1.2 A		1.2 A			
Switch Power/W	10 W	10 W	20 W	10 W	20 W	10 W	15(5V), 20	10 W	20 W	10 W	10 W	20 W	10 W	20 W
Max Initial Contact Resistance/mΩ	150 mΩ	120 mΩ	150 mΩ	120 mΩ	150 mΩ	120 mΩ	150 mΩ	120 mΩ	150 mΩ	120 mΩ	150 mΩ	150 mΩ	150 mΩ	150 mΩ
Life Expectancy/operations: Min Load	2.5 x 10^{8}	2.5 x 10^{8}	10 x 10^{9}				10 x 10^{9}		10 x 10^{9}		10^{9}			
Typical	10^{7}	10^{7}	10^{8}				10^{8}		10^{8}		10^{8}			
Max Load	10^{6}	10^{6}	10^{7}				10^{7}		10^{7}		10^{7}			
Operate Time/ms	0.5 ms	0.5 ms	0.5 ms				0.5 ms		0.5 ms		0.5 ms			
Release Time/ms	0.2 ms	0.2 ms	0.2 ms				0.2 ms		0.2 ms		0.2 ms			
Insulation Resistance/Ω	10^{12} Ω	10^{12} Ω	10^{12} Ω				10^{12} Ω		10^{12} Ω		10^{12} Ω			
Coil Resistance: 3V/Ω	–	100 Ω	–	200 Ω	–	–	–	300 Ω		300 Ω	250 Ω	–	–	–
5V/Ω	180 Ω	300 Ω	375 Ω				500 Ω	500 Ω	500 Ω	500 Ω	500 Ω	375 Ω	1000 Ω	1000 Ω
12V/Ω	–	–	600 Ω				1000 Ω	1000 Ω	1000 Ω	1000 Ω	1000 Ω		1500 Ω	
24V/Ω	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Application	Low Coil Power/Low Thermal EMF																								
Series Name	118-1-A		101-1-A						101-1-C	101-1-B		101-2-A			100-1-A					100-1-C	100-1-B		100-2-A		
Physical Outline																									
Features	Highest Quality Instrumentation Grade Reed Switches Direct Drive From CMOS														Highest Quality Instrumentation Grade Reed Switches Direct Drive From CMOS - Low Thermal EMF										
Dimensions mm (inches): Depth	5.08 (0.2)		7.4 (0.29)												10.2 (0.40)										
Width	8.38 (0.33)		20.1 (0.79)												24.1 (0.95)										
Height	15.5 (0.61)		9.4 (0.37)							12.5 (0.49)					12.7 (0.5)						15.2 (0.60)				
Footprint (0.1 inch grid)																									
Contact Configuration	1A (SPST)		1A (SPST)						1C (SPDT)	1B (SPNC)		2A (DPST)			1A (SPST)					1C (SPDT)	1B (SPNC)		2A (DPST)		
Switch Schematic																									
Reed Switch Type	General Dry Reed	Low Level Dry Reed	General Dry Reed	Low Level Dry Reed	Low Level Dry Reed (Special)	High Voltage Switch	Standard Mercury Switch	Position Insensitive Switch	Dry Reed	General Dry Reed	Low Level Dry Reed	General Dry Reed	Low Level Dry Reed	Standard Mercury Switch	General Dry Reed	Low Level Dry Reed	High Voltage Switch	Standard Mercury Switch	Position Insensitive Switch	Dry Reed	General Dry Reed	Low Level Dry Reed	General Dry Reed	Low Level Dry Reed	Standard Mercury Switch
Switch Number	1	2	1	2	2 (17D)	4	6	8	3	1	2	1	2	6	1	2	4	6	8	3	1	2	1	2	6
Diode Available	Yes		Yes												Yes										
Switching Voltage/V	200 V		200 V			500 V			200 V					500 V	200 V		500 V			200 V					500 V
Switching Current/A	1 A	0.5 A	1 A	0.5 A			2 A	2 A	0.25 A	1 A	0.5 A	1 A	0.5 A	2 A	1 A	0.5 A		2 A	2 A	0.25 A	1 A	0.5 A	1 A	0.5 A	2 A
Carry Current/A	1.2 A		1.2 A				3 A	3 A	1.2 A					3 A	1.2 A			3 A	3 A	1.2 A					3 A
Switch Power/W	15 W	10 W	15(3V), 20	10 W			50 W	50 W	3 W	15(5V), 20	10 W	15(5V), 20	10 W	50 W	15(5V), 20	10 W		50 W	50 W	3 W	15(5V), 20	10 W	15(5V), 20	10 W	50 W
Max Initial Contact Resistance/mΩ	120 mΩ		150 mΩ	120 mΩ		150 mΩ	75 mΩ	100 mΩ	200 mΩ	150 mΩ		170 mΩ	150 mΩ	100 mΩ	150 mΩ	120 mΩ	150 mΩ	100 mΩ	120 mΩ	200 mΩ	170 mΩ		200 mΩ	180 mΩ	150 mΩ
Life Expectancy/operations: Min Load	10^{9}		10^{9}						10^{8}	10^{9}					10 x 10^{9}					10^{8}	10 x 10^{9}				
Typical	10^{8}		10^{8}						10^{7}	10^{8}					10^{8}					10^{7}	10^{8}				
Max Load	10^{7}		10^{7}						10^{6}	10^{7}					10^{7}					10^{6}	10^{7}				
Operate Time/ms	0.6 ms		1 ms				1.75 ms		1.25 ms	1 ms		1 ms		1.75 ms	1 ms		1.75 ms	2 ms		1 ms	1 ms		1 ms	1 ms	2 ms
Release Time/ms	0.35 ms		0.75 ms				1.75 ms		1 ms	0.75 ms				1.75 ms	1 ms		1.75 ms	2 ms		1 ms	1 ms		1 ms	1 ms	2 ms
Insulation Resistance/Ω	10^{12} Ω		10^{12} Ω				10^{11} Ω		10^{10} Ω	10^{12} Ω				10^{11} Ω	10^{12} Ω			10^{12} Ω	10^{11} Ω	10^{10} Ω	10^{12} Ω				10^{11} Ω
Coil Resistance: 3V/Ω	–	1000 Ω	800 Ω	1600 Ω	–	–	–	–	700 Ω	–		–	1000 Ω	–	–	2000 Ω	–	–	–	–	–		–	–	–
5V/Ω	1500 Ω	2200 Ω	1600 Ω		3000 Ω	1600 Ω	375 Ω		1600 Ω	3000 Ω		1000 Ω		150 Ω	3300 Ω		2200 Ω	500 Ω	370 Ω	3300 Ω	2700 Ω				370 Ω
12V/Ω	–		6000 Ω		–	6000 Ω	1000 Ω		6000 Ω	6000 Ω		3000 Ω		650 Ω	6800 Ω			2000 Ω	1000 Ω	6800 Ω	6000 Ω				1000 Ω
24V/Ω	–		6000 Ω		–	6000 Ω	3000 Ω		6000 Ω	6000 Ω		6000 Ω		2000 Ω	6800 Ω			3300 Ω		6800 Ω	6000 Ω				3300 Ω

Application	Surface Mount								Surface Mount RF		
Series Name	200-1-A					200-2-A	200-1-C	200-1-B	200RF	102F-1-A	
Physical Outline											
Features	Highest Quality Instrumentation Grade Reed Switches Only Surface Mount Reed Relay Available with SoftCenter™ Construction										
Dimensions mm (inches): Depth	3.9 (0.154)		5.85 (0.23)						4.00 (0.154)	7.6 (0.3)	
Width	15.25 (0.6)		20.0 (0.79)			15.25 (0.6)	20.0 (0.79)	15.25 (0.6)	15.25 (0.6)	13.5 (0.53)	
Height	6.8 (0.27)		9.0 (0.35)			6.8 (0.27)	9.0 (0.35)	6.8 (0.27)	6.8 (0.27)	4.8 (0.19)	
Contact Configuration	1A (SPST)					2A (DPST)	1C (SPDT)	1B (SPNC)	1A (SPST)	1A (SPST)	
Switch Schematic											
Reed Switch Type	General Dry Reed	Low Level Dry Reed	High Volt Dry Reed	Standard Mercury Wet Reed	Position Insensitive Mercury Wet Reed	Low Level Dry Reed	Dry Reed	Low Level Dry Reed	Low Level Dry Reed	General Dry Reed	Higher Power Dry Reed
Switch Number	1	2	4	6	8	2	3	2	2	1	2
Diode Available	Yes								Yes		
Switching Voltage/V	200 V		500 V	500 V	500 V	200 V	200 V	200 V	200 V	200 V	
Switching Current/A	1 A	0.5 A	0.5 A	2 A	2 A	0.5 A	0.25 A	0.5 A	0.5 A	0.5 A	1 A
Carry Current/A	1.2 A	1.2 A	1.2 A	3 A	3 A	1.2 A	1.2 A	1.2 A	1.2 A	1.2 A	1.2 A
Switch Power/W	15(5V), 20	10 W	10 W	50 W	50 W	10 W	3 W	10 W	10 W	10 W	20 W
Max Initial Contact Resistance/mΩ	150 mΩ	120 mΩ	150 mΩ	75 mΩ	100 mΩ	120 mΩ	200 mΩ	120 mΩ	120 mΩ	100 mΩ	
Life Expectancy/operations: Min Load	10^{9}						10^{8}	10^{9}	10^{9}	10^{9}	
Typical	10^{8}						10^{7}	10^{8}	10^{8}	10^{8}	
Max Load	10^{7}						10^{6}	10^{7}	10^{7}	10^{7}	
Operate Time/ms	0.5 ms		0.5 ms	2 ms		0.5 ms	1 ms	0.5 ms	0.5 ms	0.5 ms	
Release Time/ms	0.2 ms		0.2 ms	1.25 ms		0.2 ms	0.5 ms	0.2 ms	0.2 ms	0.2 ms	
Insulation Resistance/Ω	10^{12} Ω			10^{10} Ω		10^{12} Ω	10^{11} Ω	10^{12} Ω	10^{12} Ω	10^{12} Ω	
Coil Resistance: 3V/Ω	–	250 Ω	–	–	–	–	–	–	–	250 Ω	–
5V/Ω	500 Ω			140 Ω	140 Ω	400 Ω	500 Ω	750 Ω	250 Ω	500 Ω	375 Ω
12V/Ω	1000 Ω			500 Ω	500 Ω	1000 Ω	1000 Ω	1000 Ω	-	1000 Ω	1000 Ω
24V/Ω	–	–	–	–	–	–	–	–	–	–	–

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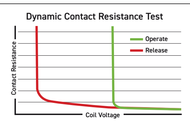
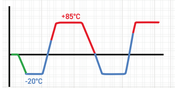
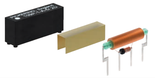
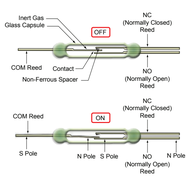
Key Benefit	Pickering Reed Relays		Typical Industry Reed Relays
1 Instrumentation Grade Reed Switches	Instrumentation Grade Reed Switches with vacuum sputtered Ruthenium plating to ensure stable, long life up to 5x10E9 operations.		Often low grade Reed Switches with electroplated Rhodium plating resulting in higher, less stable contact resistance.
2 Formerless Coil Construction	Formerless coil construction increases the coil winding volume, maximizing magnetic efficiency, allowing the use of less sensitive reed switches resulting in optimal switching action and extended lifetime at operational extremes.	 Pickering former-less coil; Typical industry coil wound on bobbin	Use of bobbins decreases the coil winding volume, resulting in having less magnetic drive and a need to use more sensitive reed switches which are inherently less stable with greatly reduced restoring forces.
3 Magnetic Screening	Mu-metal magnetic screening (either external or internal), enables ultra-high PCB side-by-side packing densities with minimal magnetic interaction, saving significant cost and space. Pickering Mu-Metal magnetic screen - interaction approx. 5%	 X-Ray of Pickering mu-metal magnetic screen; X-Ray of typical industry magnetic screen	Lower cost reed relays have minimal or no magnetic screening, resulting in magnetic interaction issues causing changes in operating and release voltages, timing and contact resistance, causing switches to not operate at their nominal voltages. **Typical industry screen - interaction approx. 30%**
4 *SoftCenter*™ Technology	*SoftCenter*™ technology, provides maximum cushioned protection of the reed switch, minimising internal lifetime stresses and extending the working life and contact stability.	 Pickering soft center protection of the reed switch; Typical industry thermo-setting hard moulded protection of the reed switch	Transfer moulded reed relays (produced using high temperature/pressure), result in significant stresses to the glass reed switch which can cause the switch blades to deflect or misalign leading to changes in the operating characteristics, contact resistance stability and operating lifetime.
5 100% Dynamic Testing	100% testing for all operating parameters including dynamic contact wave-shape analysis with full data scrutiny to maintain consistency.		Simple dc testing or just batch testing which may result in non operational devices being supplied.
6 100% Inspection at Every Stage of Manufacturing	Inspection at every stage of manufacturing maintaining high levels of quality.		Often limited batch inspection.
7 100% Thermal Cycling	Stress testing of the manufacturing processes, from -20°C to +85°C to -20°C, repeated 3 times.		Rarely included resulting in field failures.
8 Flexible Manufacturing Process	Flexible manufacturing processes allow quick-turn manufacturing of small batches.		Mass production: Usually large batch sizes and with no quick-turn manufacturing.
9 Custom Reed Relays	Our reed relays can be customized easily, e.g. special pin configurations, enhanced specifications, non-standard coil or resistance figures, special life testing, low capacitance, and more.		Limited ability to customize.
10 Product Longevity	Pickering are committed to product longevity; our reed relays are manufactured and supported for more than 25 years from introduction, typically much longer.		Most other manufacturers discontinue parts when they reach a low sales threshold; costing purchasing and R&D a great deal of unnecessary time and money to redesign and maintain supply.

Reed Relay Types

Changeover Reeds

Reed relays can be supplied with changeover switches – the reed switch has a normally closed contact (when no magnetic field is applied) and a normally open contact (which closes when the field is applied). The reed switch closed contact uses the blade as a spring bias with a non ferrous spacer to avoid completing a magnetic circuit. The coil field moves the blade to the normally open contact blade which does not have this spacer. As the reed relay switch blades transition between the two states for a brief period neither contact is closed – and important consideration in some applications.

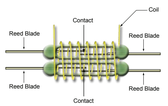


The normally closed position relies on contact pressure being created by the spring bias of the blade. As well as being much harder to manufacture than normally open reed relays the two contacts, normally closed and normally open, can have quite different characteristics and stability. Experience is generally that they have a slightly less stable contact resistance than their simpler normally open counterparts. Even so, they perform a useful function for many applications because unlike the use of two normally open reed relays used to create a changeover function they only need one coil drive and it is mechanically not possible to have both contacts closed at the same time.

Two Pole Relays

Reed relays can also be supplied as 2 pole relays where two reed switches are contained in the same package and operated by a common coil drive.

It is important to remember that these relays do not have an interlock mechanism between the two, it is unsafe to assume that that the two poles operate at exactly the same time and the two reed switches are essentially independent. There could be an operate time difference of between 50 - 250 microSeconds between them. Failure in one (say a contact weld) will not stop the other contact from moving.



Mercury Reed Relays

There is a class of reed relays that has been historically very popular where the reed contacts include mercury that provides the electrical contact between the blades. The mercury is provided by a small reservoir which blade actuation tends to pump up a grooved surface on the reed blade to the contact area using mercury's high surface tension to retain the material.

Selective chrome plating is often used in the construction since mercury and chrome do not stick together and this is used to help control the mercury.

The glass envelope of mercury relays is also highly pressurised (typically 12 to 14 bar) which helps to manage the switch materials and operation and to improve electrical parameters.

These relays are strongly preferred in some industries because they have a long contact life and bounce free contact closure – a feature that is particularly helpful under hot switch conditions. Stability of low contact resistance during their operational life is considered to be better than that of dry reed relays.

Most types of mercury reed relays are position sensitive – they can only be used in a vertical orientation. Some non position sensitive versions are also available which can be used in any orientation. Mercury wetted relays however are not RoHS compliant and national regulations may limit their use to certain critical applications where exceptions on RoHS have been granted.

High Voltage Reed Relays

High voltage reed relays in addition to having to ensure high clearance distance (including the distance between the contacts in the reed switch) have to have a carefully match operating environment and different contact materials to resist the contact erosion that occur when switching the signals. High voltage reed switches commonly use tungsten or rhodium contacts.

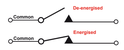
The glass envelope for high voltage reed switches is normally a very hard vacuum to maximise the voltage rating for a given blade separation and to manage arc duration as the contacts open or close. Any loss of seal will rapidly degrade the switch operation so reed switches have to be carefully managed as they are packaged into reed relays.

Relay Terminology

The relay industry has evolved with a set of its own nomenclature that describes the products that are available, not all of these terms are familiar to users. The following section seeks to describe these relay terms.

Form A

This reference describes a relay whose contact is a simple switch which is open or closed and the un-energized position is the open condition. For a single relay this would also be described as a single pole, single throw (SPST) relay with a normally open (NO) contact.



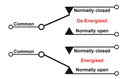
If the relay has multiple contacts in the same package it would be described as having (for example) 2 Form A contacts (DPST).

Form B

This reference describes a relay whose contact is a simple switch which is open or closed and the un-energized position is closed.

Form C (Change-over - break-before-make)

This reference describes a relay with two contact positions, the normally closed contact and the contact which becomes closed when the relay is energized. For a single relay this would also be known as a changeover switch or a single pole double throw (SPDT). If the relay has two contacts sets it would be described as 2 Form C contacts, or double pole double throw (DPDT).



Free Literature, Relay Selection and Samples

The Reed RelayMate

This book from Pickering Electronics is a publication which looks in detail at reed relays. In it you'll find out how reed relays are constructed, what types there are, how they work, what parameters affect their operation, how to choose the correct relay, a comparison with other relay technologies and how to drive and place reed relay coils.

The Reed RelayMate is available **FREE** from the Pickering Electronics' website in printed copy or pdf format.

The Concise Technical Guide

This guide will help you to maximise the reliability of your design whilst using Reed Relays. Contents includes: temperature effects, contact abuse, magnetic interaction, as well as Pickering's unique manufacturing techniques such as former-less coils and *SoftCenter*™ construction; offering many benefits over other relay manufacturers.

The Concise Technical Guide is available **FREE** from the Pickering Electronics' website in printed copy or pdf format.

The Reed Relay Selector Tool

Because Pickering offer the largest range of high-quality reed relays, sometimes it can be difficult to find the right reed relay you require. That is why we created the Reed Relay Selector. The tool will help you narrow down our offering to get you the correct reed relay for your application. Once you narrow your selections down you can download a reed relay datasheet for more information, purchase in stock items or request a quote to find out lead times of made to order (MTO) relays.

Go to: **pickeringrelay.com/reed-relay-selector-tool**

FREE

A **PCB** containing **non-working** samples of Pickering Electronics' Reed Relay range is available on request.

FREE

working evaluation samples are available on request.

Go to: pickeringrelay.com/samples

Choosing a Reed Relay

Signal Voltage, Current and Power Specifications

All reed relays have specified voltage and current ratings that need to be kept within if the reed relay is to have a long service life. It important to be clear if the application envisages hot switch or cold switching, it can have a substantial impact on the cost and size of the relay used. If hot switching is likely to occur the most common mistake is to ignore the power rating of the reed relay, the fact a particular relay may be capable of 100V and 1A does not mean it can hot switch a signal with these extremes of value. A 10W reed relay for example will only switch a 100V, 100mA signal reliably.

If hot switching is not expected to happen then the user can rely on the carry current rating and to withstand the rated voltage across the contacts.

SMD or Thru Hole Mounting

Users often have a choice of using thru hole components or surface mount packages for reed relays.

With other component types the choice may be driven in part by the density that can be achieved on a PCB, however this is not always the case with reed relays. Reed relays are not particularly small devices by modern standards as magnetic interaction can be a real problem on some systems (though not on Pickering Electronics based solutions where the built in magnetic shield prevents problems).

Manufacturing processes may prefer to use SMD components, in which case there are solutions which are available for most applications. However, the choice is more difficult when the relay is considered to be a potential service item. The relay could be considered to be a service item if it is frequently exposed to hot switching events which might wear out the contact materials or where (as is the case in ATE systems) connection to faulty devices or even programming errors can result in the relay being damaged.

Removing surface mounted components is an intrusive procedure – even using specialist de-soldering tools not only the component to be removed but also adjacent components are subject to heating, solder reflow and stress. In these circumstances thru hole components are much easier to manage and require no specialist de-soldering tools or high operator skills. It is more likely the item can be serviced locally, and it is less likely to cause damage elsewhere in the assembly.

For applications where relays may have to be serviced Pickering Electronics recommend that thru hole components are used. Outside of these applications the choice is driven by user manufacturing preferences and the component choices such as footprint area, relay ratings and relay height.

Diode or No Diode

Reed relays often have a choice to include an internal protection diode or not (in comparison this is never the case with EMRs).

The purpose of this diode is sometimes misunderstood, it is present primarily to protect the device that is driving the relay coil from the Back EMF that is generated when the current flow is interrupted.

Assuming the relay coil driver operates with an open collector drive then while the driving device is on the current flow is limited by the resistance of the relay coil. When the open collector is turned off the voltage on the output tries to rise and the current tries to drop, but the open collector drive has no conduction path to allow this to happen. The conducted current has to fall to zero to collapse the magnetic field in the coil. So the driver output voltage rises rapidly, the rate of rise being limited only by characteristics such as coil or driver capacitance. Eventually the voltage rise will limit as the driver output starts to enter voltage breakdown. This is a large impulse load for the driver and may result in premature failure.

Pickering's solution for this is to include a diode to protect the driver, when the driver output rises above the coil supply voltage the diode conducts and clamps the output voltage. As the diode clamp voltage is much less than the breakdown voltage the peak instantaneous energy dissipated is much lower, and a diode is generally designed to better handle this surge than a transistor.

Coil Voltage

Reed relays are supplied with a wide variety of coil voltage options. For logic driving 3.3V and 5V drives are the preferred choice since these voltages are directly compatible with common logic families. However, all the coils for a given reed switch have to have a certain number of Ampere Turns as previously noted, so as coil voltage is dropped the coil current required is increased. For some applications high coil currents are undesirable – they might lead to power loss in power supplies (low voltage supplies are commonly less efficient than higher voltage supplies), losses on PCB traces and the creation of larger EMC transients.

LED drivers can directly support either 5V or 12V coils, open collector drivers can support even higher voltages. However, as coil voltage increases the wire used to create the relay coil becomes finer and harder to wind without breakages. Ultimately this limits the highest voltage coils that can be offered.

For many applications 5V coils are considered a good compromise.

One factor often ignored by users is the impact of temperature on coil current. Data sheets for relays will commonly show a pick up voltage and release voltage and this is usually at a significantly lower voltage than the nominal coil voltage required. There are four principal reasons for this margin:

As temperature rises the coil resistance rises (by 0.39% per°C), the voltages are measured at more typical temperatures (25°C), so by the time the maximum rated temperature of the relay is reached the coil current can have dropped very significantly.

The coil drivers will have an output resistance which may be significant.

Actual power supply voltage can vary both from product to product and across a PCB used to distribute it.

External magnetic fields might alter the coil current needed to achieve the required field strength.

Consequently reed relays should have a reasonable operating margin to ensure reliable operation in all conditions. The lowest voltage relay coils are the most vulnerable to this type of problem.

Pickering *SoftCenter* ™ Technology

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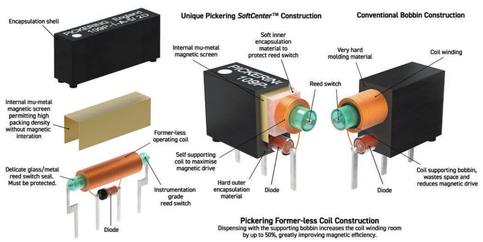

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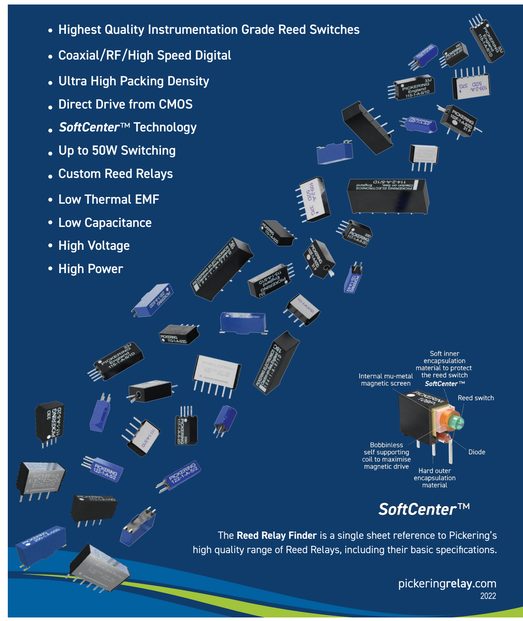


SoftCenter™

The **Reed Relay Finder** is a single sheet reference to Pickering's high quality range of Reed Relays, including their basic specifications.

pickeringrelay.com

2022

pickering Reed Relay Finder

About Pickering Electronics

Pickering Electronics was formed in January 1968 to design and manufacture high quality reed relays, intended principally for use in instrumentation and automatic test equipment.

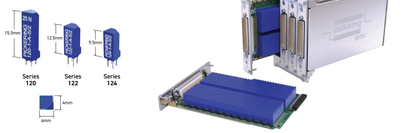
Today, the UK facility is responsible for Product Development, Technical Back-up, Sales, Marketing and Administration.

Manufacturing is shared between the UK factory and a large modern plant in Trinec, Czech Republic, with strict Quality Control and ISO 9001 certification at both facilities. Pickering Electronics s.r.o. is 100% owned by Pickering Electronics Ltd., England.

Pickering Electronics offer an extensive range of high quality instrumentation grade reed relays designed for applications requiring the highest levels of performance and reliability at an affordable price. Through the experience of supporting the most demanding manufacturers of large ATE systems with high relay counts the company has refined its assembly and quality control methods to optimise its manufacturing methods.

Working with its sister company, Pickering Interfaces (pickeringtest.com), Pickering Electronics has developed innovative reed relay solutions designed to provide high coil efficiency, low switch volume and low PCB footprint solutions to meet the demands of modern equipment manufacturers.

New ***4mm²*** Reed Relays



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