

## Pickering Series 113

# Single-in-Line SIL/SIP Reed Relays

Up to 10 Watts switching - Very high packing density

Stacks on 0.15 x 0.5 inches pitch

### Features

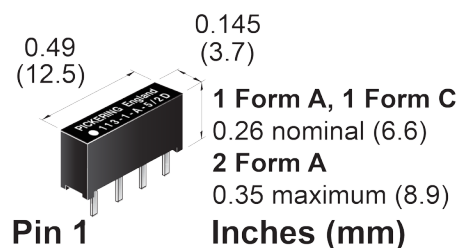
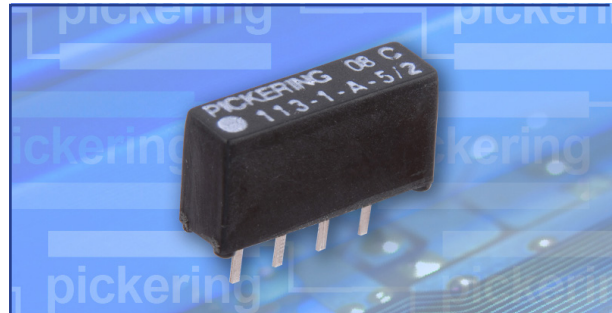
- **SoftCenter®** construction (see adjacent diagram)
- Highest quality instrumentation grade switches
- Form A versions have sputtered ruthenium contacts, ideal for Automatic Test Equipment
- Plastic package with internal mu-metal magnetic screen
- They take up very little area, conserving board space
- High insulation resistance - greater than  $10^{12}$  ohms for Form A types and greater than  $10^{10}$  ohms for Form C types
- 3, 5 and 12 Volt coils are standard, with or without internal diode
- 1 Form A, 5 volt version has a coil resistance of 500 ohms - drives directly from TTL logic
- 100% tested for dynamic contact resistance

The Pickering Series 113 is a range of magnetically screened single-in-line reed relays that require a board area of only 0.15 inches (3.8mm.) by 0.5 inches (12.7mm.) The Form A (energize to make) versions retain the 10 Watts, 0.5 Amps rating associated with larger relays. The changeover version has a 3 Watts rating.

These relays require less than half the board area of the more usual 0.2 x 0.8 inch devices and have a height of only 0.26 inches (6.6mm.) for the 1 Form A and 1 Form C types and 0.35 inches (8.9 mm.) for the 2 Form A type.

The Series 113 is encapsulated in a plastic package using a very high resistivity resin to achieve an insulation resistance greater than  $10^{12}$  ohms for the Form A types. The relay has an internal mu-metal screen which totally eliminates the risk of magnetic interaction problems. An unscreened device mounted on this pitch would have an interaction figure of around 40 percent. Relays of this size without magnetic screening would therefore be totally unsuitable for applications where dense packing is required. Pickering Series 113 have a typical interaction figure of 5 percent.

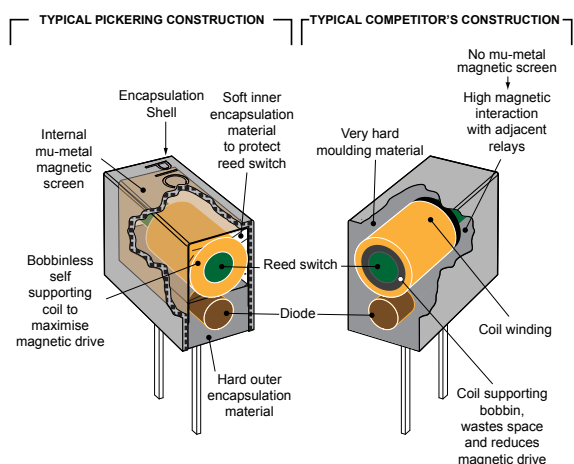
3, 5 and 12 Volt coils are standard, with the option of an internal diode. 1 Form A, 5 Volt coils have a resistance of 500 ohms and may be driven directly from TTL logic.



### Switch Ratings - Dry switches

- 1 Form A (Energize to Make) relays.  
10 Watts at 200V
- 2 Form A (Energize to Make) relays.  
10 Watts at 200V
- 1 Form C (Change-over) relays.  
3 Watts at 30V

### Typical Pickering SoftCenter® Construction



**Series 113 switch ratings** - The contact ratings for each switch type are shown below:

Switch No	Switch form	Power rating	Max. switch current	Max. carry current	Max. switching volts	Life expectancy ops typical (see Note <sup>1</sup> below)	Operate time inc bounce (max)	Release time	Special features
2	A	10 W	0.5 A	0.5 A	200	10E8	0.5 ms	0.2 ms	General purpose
3	C	3 W	0.1 A	0.1 A	30	10E8	1.0 ms	0.2 ms	Low level

Switch no.2 is particularly good for switching low currents and/or voltages. It is the ideal switch for A.T.E. systems where cold switching techniques are often used. Where higher power levels are involved, switch no. 1 is more suitable.

**Operating voltages**

Coil voltage - nominal	Must operate voltage - maximum at 25°C	Must release voltage - minimum at 25°C
3 V	2.25 V	0.3 V
5 V	3.75 V	0.5 V
12 V	9 V	1.2 V

**Coil data and type numbers**

Device type	Type Number	Coil (V)	Coil resistance	Max. contact resistance (initial)	Insulation resistance (minimum)		Capacitance (typical) (see Note <sup>2</sup> below)	
					Switch to coil	Across switch	Closed switch to coil	Across open switch
1 Form A (energize to make) Switch No. 2	113-1-A-3/2D	3	250 Ω	0.12 Ω	10E12 Ω	10E12 Ω	1.5 pF	0.15 pF
	113-1-A-5/2D	5	500 Ω					
	113-1-A-12/2D	12	650 Ω					
1 Form A (energize to make) Switch No. 2 (Special Pinout)	113SP-1-A-5/2D	5	500 Ω	0.12 Ω	10E12 Ω	10E12 Ω	1.5 pF	0.15 pF
	113SP-1-A-12/2D	12	650 Ω					
2 Form A (energize to make) Switch No. 2	113-2-A-5/2D	5	150 Ω	0.12 Ω	10E12 Ω	10E12 Ω	See Note <sup>3</sup>	See Note <sup>3</sup>
1 Form C (change-over) Switch No. 3	113-1-C-5/3D	5	150 Ω	0.25 Ω	10E12 Ω	10E10 Ω	See Note <sup>3</sup>	See Note <sup>3</sup>

When an internal diode is required, the suffix D is added to the part number as shown in the table

**Environmental specification**

**Standard operating temperature range:** -20 to +85 °C.  
 Note: The upper temperature limit can be extended to +125 °C if the coil drive voltage is increased to accommodate the resistance/temperature coefficient of the copper coil winding. This is approximately 0.4% per °C. This means that at 125 °C the coil drive voltage will need to be increased by approximately 40 x 0.4 = 16% to maintain the required magnetic drive level. Please contact sales@pickeringrelay.com for assistance if necessary.  
**Vibration:** Maximum 20 G      **Shock:** Maximum 50 G

**Note<sup>1</sup> Life expectancy**

The life of a reed relay depends upon the switch load and end of life criteria. For example, for an 'end of life' contact resistance specification of 1 Ω, switching low loads (10 V at 10 mA resistive) or when 'cold' switching, typical life is approx 2.5 x 10<sup>8</sup> ops. At the maximum load (resistive), typical life is 1 x 10<sup>6</sup> ops. In the event of abusive conditions, e.g. high currents due to capacitive inrushes, this figure reduces considerably. Pickering will be pleased to perform life testing with any particular load condition.

**Note<sup>2</sup> Capacitance across open switch**

The capacitance across the open switch was measured with other connections guarded.

**Note<sup>3</sup> Capacitance values**

The value will depend upon on the mode of connection/guarding of unused terminals. Please contact technical sales for details.

**Internal Mu-metal Magnetic Screen**

The Series 113 relays are fitted with an internal mu-metal magnetic screen which permits side-by-side stacking on 0.15 inches pitch.

**Help**

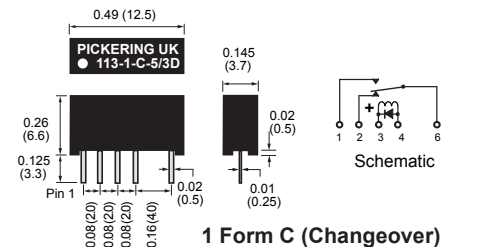
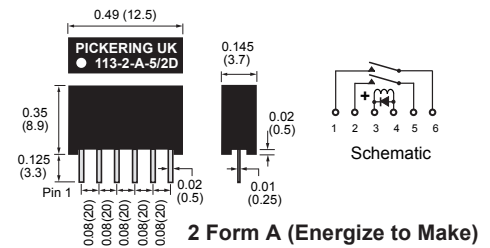
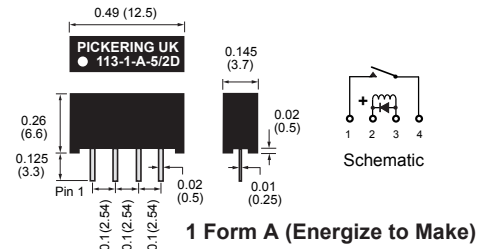
If you need any technical advice or other help, for example, any special tests that you would like carried out, please do not hesitate to contact our Technical Sales Department. We will always be pleased to discuss Pickering relays with you. email: techsales@pickeringrelay.com

Pickering Electronics Limited  
 Stephenson Road  
 Clacton-on-Sea  
 CO15 4NL  
 England  
 email: sales@pickeringrelay.com  
 Tel. (UK) 01255 428141  
 (International) +44 1255 428141  
 Fax. (UK) 01255 475058  
 (International) +44 1255 475058



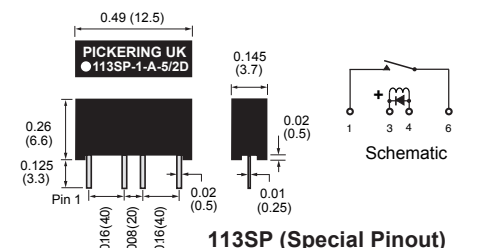
**Pin Configuration and Dimensional Data**

Dimensions in Inches (Millimeters in brackets)



**Special pin configuration for 1 Form A**

The standard 1 Form A device has 4 pins on 0.1 inches (2.54mm) pitch (see drawing above). This configuration makes it pin compatible with the Pickering Series 110, 111 and 112. A special pin configuration is also available with a pinout compatible with that of the 2 Form A type (see drawing above). The switch terminals are pins 1&6, the coil is Pins 3&4 with pins 2&5 omitted, this version has the prefix 113SP. It is sometimes desirable to have a PCB that can be used for either 1 Form A or 2 Form A switching, this arrangement allows the use of a common board fitted with the appropriate relay.



**Important:** Where the optional internal diode is fitted, the correct coil polarity must be observed, as shown by the + symbol on the schematics above.

**3D Models:** Interactive models of the complete range of Pickering relay products can be downloaded from the web site.

**Order Code**

**113 - 1 - A - 5 / 2 D**

Series \_\_\_\_\_

Number of reeds \_\_\_\_\_

Switch form \_\_\_\_\_

Coil voltage \_\_\_\_\_

Switch number (See table adjacent) \_\_\_\_\_

Diode if fitted (Omit if not required) \_\_\_\_\_

**Please ask us for a FREE evaluation sample.**

