

# Pickering Series 111

## Pico-SIL/SIP Reed Relays

Including coaxial types for up to 1.5GHz

Stacks on 0.15 x 0.40 inches pitch giving very high packing density

### Features

- **SoftCenter®** construction (see adjacent diagram)
- Highest quality instrumentation grade switches
- Mu-metal magnetic screening
- Two package styles - Mu-metal package or Plastic package with internal mu-metal magnetic screen
- They take up the minimum of board area, conserving board space
- Insulation resistance greater than  $10^{12} \Omega$
- 3 or 5 Volt coils with or without internal diode
- 100% tested for dynamic contact resistance for guaranteed performance

The Pickering Series 111 is a range of magnetically screened single-in-line reed relays that stack on 0.15 inches by 0.4 inches pitch. They have an identical footprint to the Series 110 and 112 but the height is reduced to only 0.26 inches (6.6mm). The switch rating of 5 Watts is adequate for most instrumentation applications. If a higher power rating is required, please look at our Series 110 or 112 which have a higher power rating and an identical pin-out. The range also includes the type 111RF, a 50 ohms coaxial device suitable for use up to 1.5GHz.

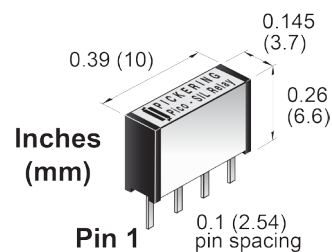
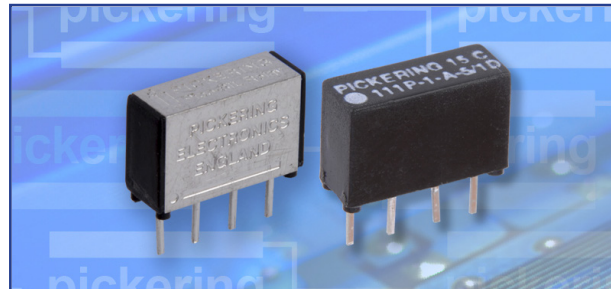
These relays require around one third the board area of the more usual 0.2 x 0.8 inch devices and are ideal for high density applications.

Two package styles are available:

The type 111 is encapsulated in a mu-metal can. The coaxial version, type 111RF, is also available in this package style.

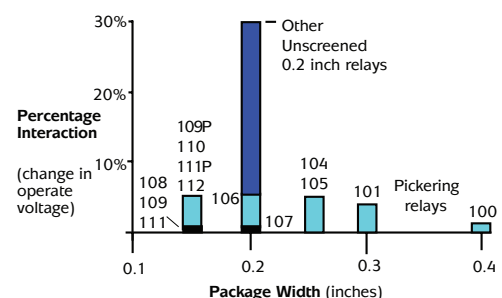
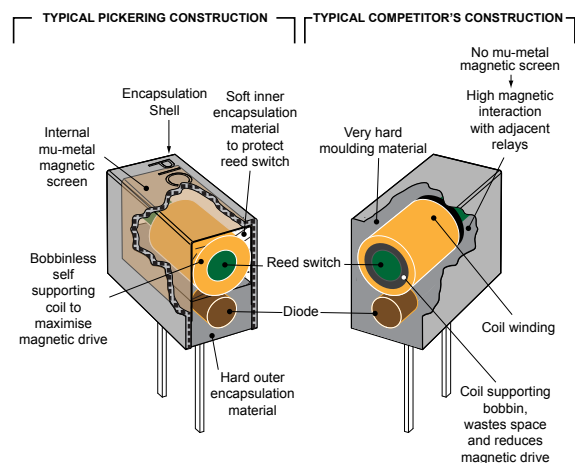
The type 111P is encapsulated in a plastic package and features an internal mu-metal screen. An internal diode is an option in both types.

Magnetic screening is essential to avoid magnetic interaction problems. Interaction is usually measured as a percentage increase in the voltage required to operate a relay when two additional relays, stacked one each side, are themselves operated. An unscreened device mounted on this pitch would have an interaction figure of around 40%. Relays of this size would therefore be totally unsuitable for applications where dense packing is required. Pickering Series 111 have an interaction figure of around 1 percent.



The plastic package features the same dimensions as the mu-metal version detailed above.

### Typical Pickering **SoftCenter®** Construction



Key: ■ Unscreened ■ Internal mu-metal screen ■ Complete mu-metal can

**Series 111 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
1	A	5 W	0.5 A	0.5 A	170	10E8	0.5 ms	0.2 ms	General purpose (Energise to make)

**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

**Coil data and type numbers**

Device type	Package Style	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 Switch No. 1	Mu-metal	111-1-A-3/1D	3	200 Ω	0.15 Ω	10E12 Ω	10E12 Ω	1.5 pF	0.15 pF
		111-1-A-5/1D	5	500 Ω					
1 Form A Switch No. 1	Plastic with internal screen	111P-1-A-3/1D	3	200 Ω	0.15 Ω	10E12 Ω	10E12 Ω	1.5 pF	0.15 pF
		111P-1-A-5/1D	5	400 Ω					
1 Form A Switch No. 1 (Coaxial)	Mu-metal	111RF-1-A-5/1D	5	180 Ω	0.15 Ω	10E12 Ω	10E12 Ω	1.5 pF	0.15 pF

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

**Environmental specification**

<b>Standard operating temperature range:</b> -20 to +85 °C.
<b>Note:</b> 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.
<b>Vibration:</b> Maximum 20 G
<b>Shock:</b> 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**

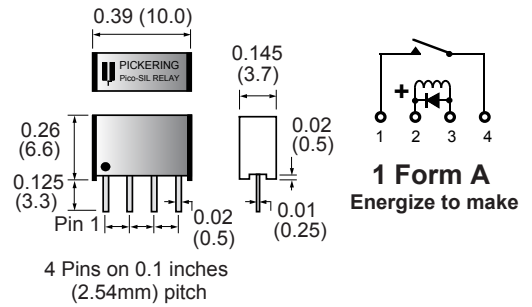
The capacitance across the open switch was measured with other connections guarded.

**Pin Configuration and Dimensional Data**

Dimensions in Inches (Millimeters in brackets)

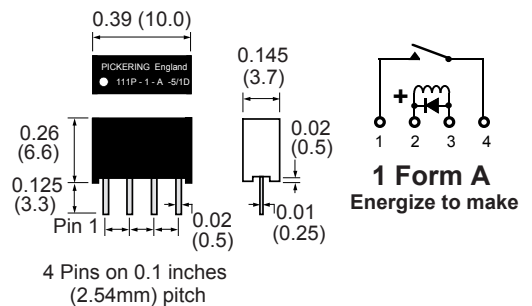
**Type 111**

Mu-metal package



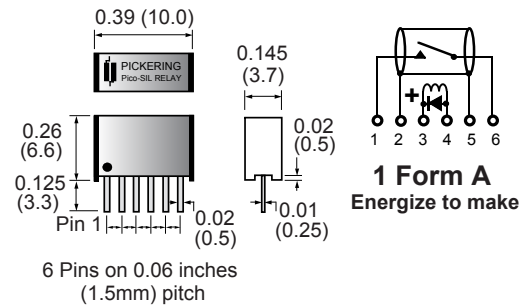
**Type 111P**

Plastic package with internal mu-metal screen



**Type 111RF**

Mu-metal package

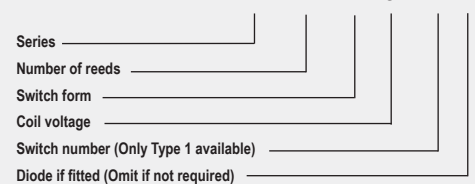


**Important:** Where the optional internal diode is fitted, the correct coil polarity must be observed, as shown by the + symbol on the schematics.

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

**Order Code**

111 - 1 - A - 5 / 1 D



**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

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

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