Pickering Series 106

Single-in-Line SIL/SIP Reed Relays

1 Form A (energise to make), 20 Watts at 200V
1 Form C (change-over), 3 Watts at 200V

Features

- SoftCenter® construction (see adjacent diagram)
- Highest quality instrumentation grade switches
- Internal mu-metal magnetic screen
- Insulation resistance greater than $10^{12}$ Ω for Form A devices
- Dry switches available in both 1 Form A and 1 Form C configurations
- 3, 5 and 12 Volt coils with or without internal diode
- 5 Volt coils are 500 ohms and may be driven directly from TTL logic
- 100% tested for dynamic contact resistance for guaranteed performance

The Series 106 is a range of Single-In-Line reed relays intended for stacking on 0.2 inches pitch. Their small size, superb contact resistance stability and ultra high insulation resistance, make these relays an ideal choice for Automatic Test Equipment. They have an internal mu-metal screen to eliminate problems that would otherwise be experienced due to magnetic interaction. While the screening is not quite as efficient as the complete mu-metal can of the Series 107, 108 or 109, it is more than adequate for most applications (see explanation below).

If even greater packing density is required, smaller devices are available in other Pickering SIL ranges.

Magnetic Interaction - An explanation

Magnetic interaction between relays is normally expressed as a percentage increase in the voltage required to operate the relay, due to the extraneous fields from adjacent relay coils.

An unscreened SIL relay of this size would have an interaction figure of around 30 percent, i.e. the voltage required to operate it will increase by this amount when relays alongside are operated also. It may prove impossible to use such a relay at its nominal coil voltage in high density applications.

A Pickering Series 106 reed relay has an interaction figure of approximately 5 percent.

Switch Ratings

- 1 Form A (Energize to Make) relays.
  Up to 1 Amp switching at 20 Watts
- 1 Form C (Change-over) relays.
  3 Watts at 200 Volts

Typical Pickering SoftCenter® Construction

- Very hard moulding material
- Bobbinless self-supporting coil to maximise magnetic drive
- No mu-metal magnetic screen
- High magnetic interaction with adjacent relays
- Soft inner encapsulation material to protect reed switch
- Variable material
- Very hard moulding material
- Internal mu-metal magnetic screen
- Bobbinless self-supporting coil to maximise magnetic drive
- Coat supporting bobbin, resists space and reduces magnetic drive
- Soft inner encapsulation material to protect reed switch
- Very hard moulding material
- Internal mu-metal magnetic screen
- Bobbinless self-supporting coil to maximise magnetic drive

Typical Competitor’s Construction

- Very hard moulding material
- Bobbinless self-supporting coil to maximise magnetic drive
- No mu-metal magnetic screen
- High magnetic interaction with adjacent relays
- Coating inner encapsulation material to protect reed switch
- Very hard moulding material
- Internal mu-metal magnetic screen
- Bobbinless self-supporting coil to maximise magnetic drive
- Coat supporting bobbin, resists space and reduces magnetic drive
- Soft inner encapsulation material to protect reed switch
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Typical Pickering Construction

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Operating voltages

<table>
<thead>
<tr>
<th>Coil voltage (V)</th>
<th>Must operate voltage - maximum at 25°C</th>
<th>Must release voltage - minimum at 25°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2.25 V</td>
<td>0.3 V</td>
</tr>
<tr>
<td>5</td>
<td>3.75 V</td>
<td>0.6 V</td>
</tr>
<tr>
<td>12</td>
<td>9 V</td>
<td>1.2 V</td>
</tr>
</tbody>
</table>

Coil data and type numbers

<table>
<thead>
<tr>
<th>Device type</th>
<th>Type Number</th>
<th>Coil resistance (Ω)</th>
<th>Max. contact resistance (initial)</th>
<th>Switch to coil</th>
<th>Across switch</th>
<th>Closed switch to coil</th>
<th>Across open switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Form A (energize to make)</td>
<td>106-1-A-5/1D</td>
<td>500</td>
<td>0.15 Q</td>
<td>10E12 Q</td>
<td>10E12 Q</td>
<td>2.5 pF</td>
<td>0.1 pF</td>
</tr>
<tr>
<td>General Purpose</td>
<td>106-1-A-12/1D</td>
<td>1000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switch No. 1</td>
<td>106-1-A-12/1D</td>
<td>500</td>
<td>0.15 Q</td>
<td>10E12 Q</td>
<td>10E12 Q</td>
<td>2.5 pF</td>
<td>0.1 pF</td>
</tr>
<tr>
<td>1 Form A (energize to make)</td>
<td>106-1-A-3/2D</td>
<td>500</td>
<td>0.12 Q</td>
<td>10E12 Q</td>
<td>10E12 Q</td>
<td>2.5 pF</td>
<td>0.1 pF</td>
</tr>
<tr>
<td>Low Level Switch No. 2</td>
<td>106-1-A-12/12D</td>
<td>1000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Form C (change-over)</td>
<td>106-1-C-3/50D</td>
<td>500</td>
<td>0.20 Q</td>
<td>10E12 Q</td>
<td>10E10 Q</td>
<td>See Note² See Note³</td>
<td></td>
</tr>
<tr>
<td>Switch No. 3</td>
<td>106-1-C-12/2D</td>
<td>1000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</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.

Vibration: Maximum 20 G

Shock: Maximum 50 G

Note¹ 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 Q, switching low loads (10 V at 10 mA resistive) or when ‘cold’ switching, typical life is approx 1 x 10⁷ ops. At the maximum load (resistive), typical life is 1 x 10⁶ ops. In the event of abusive conditions, e.g. high currents due to capacitive inrushes, techniques are often used. Where higher power levels are involved, switch no. 1 is more suitable.

Note² Capacitance across open switch

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

Note³ Capacitance values

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

Internal Mu-metal Magnetic Screen

The Series 106 relays are fitted with an internal mu-metal magnetic screen which permits side-by-side stacking on 0.2 inches pitch.

Mercury Relays

With the exception of the position insensitive type, mercury relays should be mounted vertically with pin 1 uppermost.

Series 106 switch ratings - The contact ratings for each switch type are shown below:

<table>
<thead>
<tr>
<th>Switch No.</th>
<th>Switch form</th>
<th>Power rating</th>
<th>Max. switch current</th>
<th>Max. carry current</th>
<th>Max. switching volts</th>
<th>Life expectancy (ops typical) (see Note¹ below)</th>
<th>Operate time inc bounce (max)</th>
<th>Release time</th>
<th>Special features</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>20 W</td>
<td>1.0 A</td>
<td>1.2 A</td>
<td>200</td>
<td>10E9</td>
<td>0.5 ms</td>
<td>0.2 ms</td>
<td>General purpose</td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>10 W</td>
<td>0.5 A</td>
<td>1.2 A</td>
<td>200</td>
<td>10E9</td>
<td>0.5 ms</td>
<td>0.2 ms</td>
<td>Low level</td>
</tr>
<tr>
<td>3</td>
<td>C</td>
<td>3 W</td>
<td>0.25 A</td>
<td>1.2 A</td>
<td>200</td>
<td>10E7</td>
<td>1.0 ms</td>
<td>0.5 ms</td>
<td>Change over</td>
</tr>
</tbody>
</table>

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.

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

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Please ask us for a FREE evaluation sample.