Pickering Series 104

High Voltage SIL/SIP Reed Relays
Up to 3 kilovolts Stand-off
Stacking on 0.25 inches pitch

Features
- Small size
- Internal mu-metal magnetic screen
- One or two switches in a single package
- Form A (energise to make) or Form B (energise to break) configurations
- Dry and mercury wetted switches available
- 3, 5, 12 and 24 Volt coils with or without internal diode
- 100% tested for dynamic contact resistance for guaranteed performance

The Series 104 is a range of Single-In-Line reed relays intended for voltages that are beyond the capabilities of conventional SIL reed relays.

They are ideal for such applications as transformer or cable testing or any other automatic test equipment where high voltages are involved.

Where mains voltages are switched, for example to control and isolate S.C.R. or triac gates, they are an ideal choice.

One or two Form A (energize to make) or one Form B (energize to break) configurations are available.

The range features an internal mu-metal screen to eliminate problems that would otherwise be experienced due to magnetic interaction when they are closely stacked.

Three types of dry switches are available, capable of standing-off 1, 1.5 or 3kV d.c. The 3kV version has an increased clearance between the switch and coil pins to accommodate the higher voltage. Even higher voltage ratings are available to special order, please contact our sales office for further information.

Mercury wetted devices are also available for applications where bounce free switching is required. These are rated at 1500 volts d.c. minimum stand-off, 500 volts d.c. switching at up to 50 watts.

Switch Ratings - Dry switches
- 1 or 2 Form A (energize to make)
  1000 Volts d.c. minimum stand-off
  500 Volts d.c. switching at 10 Watts
- 1 or 2 Form A (energize to make)
  1500 Volts d.c. minimum stand-off
  1000 Volts d.c. switching at 10 Watts
- 1 Form A (energize to make)
  3000 Volts d.c. minimum stand-off
  1000 Volts d.c. switching at 25 Watts
- 1 Form B (energize to break)
  1000 Volts d.c. minimum stand-off
  500 Volts d.c. switching at 10 Watts
- 1 Form B (energize to break)
  1500 Volts d.c. minimum stand-off
  1000 Volts d.c. switching at 10 Watts

Switch Ratings - Mercury switches
- 1 or 2 Form A (energize to make)
  1500 Volts d.c. minimum stand-off
  500 Volts d.c. switching at 50 Watts
Series 104 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>Min. stand-off volts</th>
<th>Life expectancy (see Note1 below)</th>
<th>Operate time inc bounce (max)</th>
<th>Release time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>10 W</td>
<td>0.50 A</td>
<td>1.0 A</td>
<td>500</td>
<td>1000</td>
<td>10(^2)</td>
<td>1.0 ms</td>
<td>0.3 ms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 W</td>
<td>0.50 A</td>
<td>1.0 A</td>
<td>1000</td>
<td>1500</td>
<td>10(^2)</td>
<td>1.0 ms</td>
<td>0.3 ms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25 W</td>
<td>1.00 A</td>
<td>1.5 A</td>
<td>1000</td>
<td>3000</td>
<td>10(^2)</td>
<td>1.0 ms</td>
<td>0.3 ms</td>
</tr>
</tbody>
</table>

Coil data and type numbers

<table>
<thead>
<tr>
<th>Device type</th>
<th>Type Number</th>
<th>Coil (Ω)</th>
<th>Max. contact resistance (minimum)</th>
<th>Insulation resistance (typical)</th>
<th>Capacitance (typical) (see Note2 below)</th>
<th>Operate time (max)</th>
<th>Release time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Form A (energize to make)</td>
<td>104-1-A-5/1D</td>
<td>375</td>
<td>0.15 (Ω)</td>
<td>10(^{-1}) (Ω)</td>
<td>10(^{-2}) (Ω)</td>
<td>2.5 pF</td>
<td>0.1 pF</td>
</tr>
<tr>
<td>1 Form A (energize to make)</td>
<td>104-1-A-5/12D</td>
<td>1000</td>
<td>0.15 (Ω)</td>
<td>10(^{-1}) (Ω)</td>
<td>10(^{-2}) (Ω)</td>
<td>2.5 pF</td>
<td>0.1 pF</td>
</tr>
<tr>
<td>1 Form A (energize to make)</td>
<td>104-1-A-24/12D</td>
<td>3000</td>
<td>0.15 (Ω)</td>
<td>10(^{-1}) (Ω)</td>
<td>10(^{-2}) (Ω)</td>
<td>2.5 pF</td>
<td>0.1 pF</td>
</tr>
<tr>
<td>1 Form A (energize to make)</td>
<td>104-1-A-5/2D</td>
<td>375</td>
<td>0.15 (Ω)</td>
<td>10(^{-1}) (Ω)</td>
<td>10(^{-2}) (Ω)</td>
<td>2.5 pF</td>
<td>0.1 pF</td>
</tr>
<tr>
<td>1 Form A (energize to make)</td>
<td>104-1-A-5/12D</td>
<td>1000</td>
<td>0.15 (Ω)</td>
<td>10(^{-1}) (Ω)</td>
<td>10(^{-2}) (Ω)</td>
<td>2.5 pF</td>
<td>0.1 pF</td>
</tr>
<tr>
<td>1 Form A (energize to make)</td>
<td>104-1-A-24/12D</td>
<td>3000</td>
<td>0.15 (Ω)</td>
<td>10(^{-1}) (Ω)</td>
<td>10(^{-2}) (Ω)</td>
<td>2.5 pF</td>
<td>0.1 pF</td>
</tr>
<tr>
<td>1 Form B (energize to break)</td>
<td>104-1-B/5-1D</td>
<td>375</td>
<td>0.15 (Ω)</td>
<td>10(^{-1}) (Ω)</td>
<td>10(^{-2}) (Ω)</td>
<td>2.5 pF</td>
<td>0.1 pF</td>
</tr>
<tr>
<td>1 Form B (energize to break)</td>
<td>104-1-B-5/12D</td>
<td>1000</td>
<td>0.15 (Ω)</td>
<td>10(^{-1}) (Ω)</td>
<td>10(^{-2}) (Ω)</td>
<td>2.5 pF</td>
<td>0.1 pF</td>
</tr>
<tr>
<td>1 Form B (energize to break)</td>
<td>104-1-B-24/12D</td>
<td>3000</td>
<td>0.15 (Ω)</td>
<td>10(^{-1}) (Ω)</td>
<td>10(^{-2}) (Ω)</td>
<td>2.5 pF</td>
<td>0.1 pF</td>
</tr>
<tr>
<td>2 Form A (energize to make)</td>
<td>104-2-A-5/1D</td>
<td>375</td>
<td>0.15 (Ω)</td>
<td>10(^{-1}) (Ω)</td>
<td>10(^{-2}) (Ω)</td>
<td>2.5 pF</td>
<td>0.1 pF</td>
</tr>
<tr>
<td>2 Form A (energize to make)</td>
<td>104-2-A-5/12D</td>
<td>1000</td>
<td>0.15 (Ω)</td>
<td>10(^{-1}) (Ω)</td>
<td>10(^{-2}) (Ω)</td>
<td>2.5 pF</td>
<td>0.1 pF</td>
</tr>
<tr>
<td>2 Form A (energize to make)</td>
<td>104-2-A-24/12D</td>
<td>3000</td>
<td>0.15 (Ω)</td>
<td>10(^{-1}) (Ω)</td>
<td>10(^{-2}) (Ω)</td>
<td>2.5 pF</td>
<td>0.1 pF</td>
</tr>
</tbody>
</table>

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

**Mercury Reed: Series 104 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>Min. stand-off volts</th>
<th>Life expectancy (ops typical) (see Note1 below)</th>
<th>Operate time (max)</th>
<th>Release time</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>A</td>
<td>50 W</td>
<td>2.00 A</td>
<td>3.00 A</td>
<td>500</td>
<td>1500</td>
<td>10(^2)</td>
<td>1.5 ms</td>
<td>1.0 ms</td>
</tr>
</tbody>
</table>

**Mercury Relay: Coil data and type numbers**

<table>
<thead>
<tr>
<th>Device type</th>
<th>Type Number</th>
<th>Coil (Ω)</th>
<th>Max. contact resistance (initial)</th>
<th>Insulation resistance (minimum)</th>
<th>Capacitance (typical) (see Note2 below)</th>
<th>Operate time (max)</th>
<th>Release time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Form A (energize to make)</td>
<td>104-1-A-5/1D</td>
<td>100</td>
<td>0.20 (Ω)</td>
<td>10(^{-1}) (Ω)</td>
<td>10(^{-2}) (Ω)</td>
<td>2.5 pF</td>
<td>0.1 pF</td>
</tr>
<tr>
<td>1 Form A (energize to make)</td>
<td>104-1-A-5/12D</td>
<td>250</td>
<td>0.20 (Ω)</td>
<td>10(^{-1}) (Ω)</td>
<td>10(^{-2}) (Ω)</td>
<td>2.5 pF</td>
<td>0.1 pF</td>
</tr>
<tr>
<td>1 Form A (energize to make)</td>
<td>104-1-A-24/12D</td>
<td>500</td>
<td>0.20 (Ω)</td>
<td>10(^{-1}) (Ω)</td>
<td>10(^{-2}) (Ω)</td>
<td>2.5 pF</td>
<td>0.1 pF</td>
</tr>
<tr>
<td>2 Form A (energize to make)</td>
<td>104-2-A-5/1D</td>
<td>50</td>
<td>0.15 (Ω)</td>
<td>10(^{-1}) (Ω)</td>
<td>10(^{-2}) (Ω)</td>
<td>See Note3</td>
<td>See Note3</td>
</tr>
<tr>
<td>2 Form A (energize to make)</td>
<td>104-2-A-5/12D</td>
<td>250</td>
<td>0.15 (Ω)</td>
<td>10(^{-1}) (Ω)</td>
<td>10(^{-2}) (Ω)</td>
<td>See Note3</td>
<td>See Note3</td>
</tr>
</tbody>
</table>

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

**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 \(Ω\), switching low loads (10 V at 10 mA resistive) or when ‘cold’ switching, typical life is approx 1 x 10\(^6\) ops. At the maximum load (resistive), typical life is 1 x 10\(^8\) 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.

**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.

**Mercury Relays**
- Mercury relays should be mounted vertically with pin 1 uppermost. Pin 1 is marked with a bar on the top face of the relay.

Internal Mu-metal Magnetic Screen
- The Series 104 relays are fitted with an internal mu-metal magnetic screen which permits side-by-side stacking.

Main contact:
- UK Headquarters: email: sales@pickeringrelay.com | Tel. +44 1255 428141
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  - USA: email: ussales@pickeringtest.com | Tel. +1 781 897 1710
  - Germany: email: desales@pickeringtest.com | Tel. +49 89 125 953 160
  - China: email: johnson@tometech.cn | Tel. 0755 8374 5452
- For a full list of agents and representatives visit: pickeringrelay.com/agents

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

**Pin Configuration and Dimensional Data**
- Dimensions in Inches (Millimeters in brackets)

**Order Code**
- 104 - 1 - A - 5 / 2 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.