Cradle Relay N

The Best Relaytion
Cradle Relay N
V23154 / V23162

PCB, hand solder or plug-in relays, for DC operation, non-polarized, non-latching

**Features**
- Multi purpose relay
- Highly reliable
- Great variety of contact arrangements and materials to meet specific applications
- Contacts for signal loads and currents up to 5 A
- AC and DC, latching and non-latching, coils operating voltage 1.5 V ... 125 V
- Sockets for easy and quick mounting of relays (see data sheet Accessories)

**Typical applications**
- Measurement and control equipment
- Press controls with high safety requirements (forcibly guided springs)
- Telecommunications

**Versions**
- Size I or II, depending on contact set
- Standard contact sets with max. 4 changeover, 2 break or 6 make contacts, special configurations on request
- Single or bifurcated contacts
- Hand solder terminals also for plug-in connection with screw fixing or PCB terminals
- Dust-protected with plastic cover, hermetically sealed with metal enclosure
Cradle Relay N V23154

Version V23154-Mxxxx Size I and V23154-Nxxxx Size II

For printed circuit mounting
With or without earth terminal
Dust-protected

Dimension drawing (in mm)

Size I

Size II

Mounting hole layout
View onto the component side of the PCB

M = Earth terminal

a) Hole for mechanical armature actuation, if required
b) Hole for socket mounting with screw M1.6,
Cradle Relay N  
V23154

Version  
V23154-C0xxx Size I and  
V23154-D0xxx Size II

Hand solder terminals, silver-plated

Also for plug-in connection  
ans screw fixing

With earth terminal

Dust-protected

Dimension drawing (in mm)

Size I  
Size II

For sockets and hold-down springs see data sheet Accessories
Cradle Relay N V23162

Version V23162-A0xxx Size I and V23162-B0xxx Size II

With hand solder terminals, silver-plated
Also for plug-in connection and screw fixing
With earth terminal
Hermetically sealed

Dimension drawing (in mm)

Size I

Size II

For sockets and hold-down springs see data sheet Accessories
### Contact Data

<table>
<thead>
<tr>
<th>Ordering code block 3</th>
<th>B104/B110/B112</th>
<th>B604/B610/B612</th>
<th>C104/C110/C112</th>
<th>C404/C410</th>
<th>F104 ... F107</th>
</tr>
</thead>
</table>

**Type of contact**
- max. 4 changeover contacts, 2 break contacts or 6 make contacts

**Contact assembly**
- single contacts
- bifurcated contacts
- single contacts

**Contact material**
- silver, gold-flashed
- gold F

**Max. switching voltage**
- 150 Vdc
- 36 Vdc
- 125 Vdc
- 30 Vdc
- 150 Vdc
- 36 Vdc
- 250 Vdc
- 250 Vac

**Max. switching current**
- 2 A
- 0.2 A
- 2 A
- 0.2 A
- 5 A

**Max. switching capacity**
- 35 to 70 W
- 5 W
- 5 VA
- see load limit curve page 7
- 50 VA
- 50 to 140 W
- see load limit curve page 7
- 500 VA

**Max. continuous current at max. ambient temperature**
- 2 A
- 5 A

### Contact sets

#### Size I

<table>
<thead>
<tr>
<th>Number of contacts and type</th>
<th>2 changeover contacts</th>
<th>2 make contacts</th>
<th>2 break contacts</th>
<th>1 break 1 make contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symbols with base connections</td>
<td>8 10 5 7</td>
<td>10 7</td>
<td>8 5</td>
<td>8 7</td>
</tr>
<tr>
<td>coil I</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>coil II</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>-+</td>
<td>-+</td>
<td>-+</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Contacts in release condition, coil polarity to set the relay</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Contact assembly**
- single contacts
- bifurcated contacts
- single contacts

**Contact material**
- silver, gold-flashed

**Ordering code block 3**
- B104
- C110
- F105
- F107
- F106

**Ordering code block 3**
- B604
- C404

#### Size II

<table>
<thead>
<tr>
<th>Number of contacts and type</th>
<th>6 make contacts</th>
<th>4 changeover</th>
<th>2 changeover</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symbols with base connections</td>
<td>16 10</td>
<td>14 16 8 10</td>
<td>11 14 5 8</td>
</tr>
<tr>
<td>coil I</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>coil II</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>+2</td>
<td>+1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contacts in release condition, coil polarity to set the relay</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Contact assembly**
- single contacts
- bifurcated contacts
- single contacts
- bifurcated contacts
- single contacts

**Contact material**
- silver, gold-flashed

**Ordering code block 3**
- B112
- C112
- B110
- C110
- F104

**Ordering code block 3**
- B612
- B610
- C410

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**Cradle Relay N**

**V23154 / V23162**

**AXICOM**
Load limit curve for contact sets B1xx and C1xx

Safe breaking, no stationary arc
Contact material silver, gold-flashed

Load limit curve for contact sets F1xx

Safe breaking, no stationary arc
Contact material silver, gold-flashed
**Cradle Relay N**  
V23154 / V23162

## Coil Data

<table>
<thead>
<tr>
<th>Nominal voltage</th>
<th>Operating voltage range at 20° C</th>
<th>Resistance at 20° C</th>
<th>Coil number</th>
<th>Ordering code block 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>from 5 VDC to 125 VDC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical nominal power consumption, at 20°C</td>
<td>0.8 W</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class of the operative range</td>
<td>acc to EN 61810-1 / IEC 61810-1 and VDE 0435 Part 201</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating voltage (according to the coil type)</td>
<td>max. 98% of the nominal voltage</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Contact sets

<table>
<thead>
<tr>
<th>Nominal voltage</th>
<th>Operating voltage range at 20° C</th>
<th>Resistance at 20° C</th>
<th>Coil number</th>
<th>Ordering code block 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>U&lt;sub&gt;nom&lt;/sub&gt;</td>
<td>V&lt;sub&gt;dc&lt;/sub&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum voltage U&lt;sub&gt;I&lt;/sub&gt;</td>
<td>V&lt;sub&gt;dc&lt;/sub&gt;</td>
<td>Maximum voltage U&lt;sub&gt;II&lt;/sub&gt;</td>
<td>V&lt;sub&gt;dc&lt;/sub&gt;</td>
<td>Ω</td>
</tr>
<tr>
<td>V&lt;sub&gt;104/-B604/-F105&lt;/sub&gt;</td>
<td>V&lt;sub&gt;-B110/-B112/-B610/-612/-C104/-C404/-F104/-F106/-F107&lt;/sub&gt;</td>
<td>V&lt;sub&gt;-C112/-C110/-C410&lt;/sub&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 1.8 2.5 3 3.7 7.2 28 ±3 711</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 5.3 7.1 8.7 10.5 20 220 ±22 717</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 11 14.5 18 22 40 890 ±89 721</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>48 23 30 37 45 75 3200 ±480 726</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60 27 36 43 53 92 4700 ±705 734</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>110 49 65 79 98 164 15000 ±1500 735</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>125 61 81 99 122 190 20900 ±3140 703</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Termsinals:
Coil with 1 winding
Start 4 End 1

Coil with 2 windings (upon request)
Start 3 End 2 for winding I
Start 4 End 1 for winding II

The minimum voltage \( U_I \) depends on the contact set and the ambient temperature, the maximum voltage \( U_{II} \) only depends on the ambient temperature.

Between minimum voltage \( U_{I,\text{tamb}} \) and operating voltage \( U \) a safety margin of approx. 20% is recommended.

\[
\begin{align*}
U_{I,\text{tamb}} &\leq U_I \\
U_{I,\text{tamb}} &= U_I \cdot U_{20\degree \text{C}} \cdot k_I \\
U_{II,\text{tamb}} &= U_{II} \cdot U_{20\degree \text{C}} \cdot k_{II} \\
t_{\text{tamb}} &= \text{Ambient temperature} \\
U &= \text{Operating voltage} \\
U_{I,\text{tamb}} &= \text{Minimum voltage at ambient temperature, } t_{\text{tamb}} \\
U_{II,\text{tamb}} &= \text{Maximum voltage at ambient temperature, } t_{\text{tamb}} \\
k_I \text{ and } k_{II} &= \text{Factors}
\end{align*}
\]
Instructions for impulse operation

The maximum voltage stated in the table (page 8) can be increased for impulse operation as follows:

\[ U_{\text{Impulse}} = U_{\text{tamb}} \cdot q \]

\[ U_{\text{tamb}} = \text{Maximum continuous voltage at ambient temperature } t_{\text{amb}} \]

\[ q = \text{Factor} \]

The impulse voltage must not exceed 80% of the test voltage (winding/frame or winding/winding) or 2.5 times the value of the maximum voltage listed in the table (page 8).

If \( t_{\text{ED}} \leq 3 \text{ s} \) then \( q = \sqrt{\frac{t_2}{t_{\text{ED}}}} \)

If \( t_{\text{ED}} = \text{Pulse width} \)

If \( t_2 = \text{Cycle time} \)

If \( t_{\text{ED}} \geq 3 \text{ s} \) the value of \( q \) must be obtained from the nomograph (next page).

Examples of various periodic pulse trains (energizing side)

1. Periodic recurrence of one energizing pulse

2. Periodic recurrence of two unequal energizing pulses

\[ t_{\text{ED}} = t_1 + t_2 \]

\[ t_1 + t_2 = \text{Pulse widths within one cycle} \]
Nomograph for determining factor \( q \)
## General data

<table>
<thead>
<tr>
<th>Ordering code block 3</th>
<th>B1xx</th>
<th>B6xx</th>
<th>C1xx</th>
<th>C4xx</th>
<th>F1xx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operate time at $U_{\text{nom}}$ and $20^\circ C$, typical</td>
<td>7.5 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reset time typical</td>
<td>3 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum switching rate without load</td>
<td>50 operations/s</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature range acc. to EN 61810-1 / IEC 61810-1 and VDE 0435 part 201</td>
<td>$-40^\circ C \ldots +70^\circ C$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermal resistance</td>
<td>50 K/W</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum temperature</td>
<td>100°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous thermal load</td>
<td>1.6 W</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree of protection acc. to EN 60529 / IEC 60529 / VDE 0470 part 1</td>
<td>dust-protected IP 30 or hermetically sealed IP 67</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanical endurance</td>
<td>approx. $10^8$ operations</td>
<td>approx. $10^7$ operations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting position</td>
<td>any</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processing information</td>
<td>Ultrasonic cleaning should be avoided if possible or carried out only after consulting the manufacturer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V23154-C0/-MO</td>
<td>Size I</td>
<td>approx. 20 g</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V23154-D0/-NO</td>
<td>Size II</td>
<td>approx. 25 g</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V23162-A0</td>
<td>Size I</td>
<td>approx. 30 g</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V23162-B0</td>
<td>Size II</td>
<td>approx. 35 g</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Insulation

<table>
<thead>
<tr>
<th>Test voltage (1 min)</th>
<th>B1xx</th>
<th>B6xx</th>
<th>C1xx</th>
<th>C4xx</th>
<th>F1xx</th>
</tr>
</thead>
<tbody>
<tr>
<td>winding / frame</td>
<td>500 Vac$_{\text{rms}}$</td>
<td>500 Vac$_{\text{rms}}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>contact / contact</td>
<td>500 Vac$_{\text{rms}}$</td>
<td>1000 Vac$_{\text{rms}}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>contact / frame</td>
<td>500 Vac$_{\text{rms}}$</td>
<td>1000 Vac$_{\text{rms}}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>contact / coil</td>
<td>1000 Vac$_{\text{rms}}$</td>
<td>1500 Vac$_{\text{rms}}$</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Basic type number of cradle relay N
V23154 = dust-protected
V23162 = hermetically sealed

Relay type
A0 = Size I, for plug-in and screw fixing, hand solder terminals tinned, with earth terminal, hermetically sealed
B0 = Size II, for plug-in and screw fixing, hand solder terminals tinned, with earth terminal, hermetically sealed
C0 = Size I, for plug-in and screw fixing, hand solder terminals silver-plated, with earth terminal, dust-protected
D0 = Size II, for plug-in and screw fixing, hand solder terminals silver-plated, with earth terminal, dust-protected
M0 = Size I, for printed circuit mounting, with earth terminal, dust-protected
N0 = Size II, for printed circuit mounting, with earth terminal, dust-protected
M4 = Size I, for printed circuit mounting, without earth terminal, dust-protected
N4 = Size II, for printed circuit mounting, without earth terminal, dust-protected

Coil number
Versions see page 8

Contact set / type of contact
see page 6

Ordering example:
V23154-D0721-B110
Cradle relay N, size II, plug-in, dust-protected, with solder terminals, silver-plated, coil 24 Vdc, 4 changeover contact set, single contacts, contact material silver, gold-flashed, with earth terminal,

Note:
The ordering scheme enables a multitude of variations. However, not all variations are defined as construction specifications (ordering code) and thus in the current delivery program.
## Ordering Information

<table>
<thead>
<tr>
<th>Relay Code</th>
<th>Tyco Part Number</th>
<th>Relay Code</th>
<th>Tyco Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>V23154C702F101</td>
<td>3-1393806-3</td>
<td>V23154D719B110</td>
<td>5-1393808-6</td>
</tr>
<tr>
<td>V23154C704B104</td>
<td>4-1393806-3</td>
<td>V23154D719F104</td>
<td>6-1393808-2</td>
</tr>
<tr>
<td>V23154C716B104</td>
<td>6-1393806-4</td>
<td>V23154D720B110</td>
<td>6-1393808-5</td>
</tr>
<tr>
<td>V23154C717B104</td>
<td>6-1393806-7</td>
<td>V23154D720C110</td>
<td>7-1393808-0</td>
</tr>
<tr>
<td>V23154C719B104</td>
<td>7-1393806-1</td>
<td>V23154D720C410</td>
<td>7-1393808-3</td>
</tr>
<tr>
<td>V23154C720B104</td>
<td>7-1393806-8</td>
<td>V23154D720F104</td>
<td>7-1393808-6</td>
</tr>
<tr>
<td>V23154C720C104</td>
<td>8-1393806-1</td>
<td>V23154D720W56</td>
<td>7-1393808-8</td>
</tr>
<tr>
<td>V23154C720F106</td>
<td>8-1393806-3</td>
<td>V23154D721B110</td>
<td>8-1393808-3</td>
</tr>
<tr>
<td>V23154C721B104</td>
<td>8-1393806-6</td>
<td>V23154D721B112</td>
<td>8-1393808-4</td>
</tr>
<tr>
<td>V23154C721B604</td>
<td>8-1393806-7</td>
<td>V23154D721B610</td>
<td>9-1393808-2</td>
</tr>
<tr>
<td>V23154C721C104</td>
<td>8-1393806-8</td>
<td>V23154D721C110</td>
<td>9-1393808-5</td>
</tr>
<tr>
<td>V23154C721F105</td>
<td>9-1393806-1</td>
<td>V23154D721F104</td>
<td>0-1393809-1</td>
</tr>
<tr>
<td>V23154C722B104</td>
<td>9-1393806-4</td>
<td>V23154D722B110</td>
<td>1-1393809-4</td>
</tr>
<tr>
<td>V23154C726B104</td>
<td>0-1393807-6</td>
<td>V23154D722F104</td>
<td>2-1393809-4</td>
</tr>
<tr>
<td>V23154D421B110</td>
<td>3-1393807-7</td>
<td>V23154D726B110</td>
<td>3-1393809-2</td>
</tr>
<tr>
<td>V23154D421F104</td>
<td>4-1393807-4</td>
<td>V23154D726F104</td>
<td>4-1393809-4</td>
</tr>
<tr>
<td>V23154D703F104</td>
<td>0-1393808-4</td>
<td>V23154M721B104</td>
<td>2-1393810-7</td>
</tr>
<tr>
<td>V23154D704B110</td>
<td>0-1393808-6</td>
<td>V23154N719B110</td>
<td>6-1393810-3</td>
</tr>
</tbody>
</table>