Since 1984, Altech Corporation has grown to become a leading supplier of automation and industrial control components. Headquartered in Flemington, NJ, Altech has an experienced staff of engineering, manufacturing and sales personnel to provide the highest quality products with superior service. This is the Altech Commitment!

Altech’s line of safety relays are manufactured by DOLD®, a company well known in Europe for its quality safety relays. The products presented in this catalog will help you meet requirements of Machinery Directive 2006/42/EC, important international safety standards, CE-marking demand, and more, when exporting your machinery or equipment.

What is a Safety Relay?
A safety relay contains force guided contacts; they are also known as captive, locked or positive guided contacts. Force guidance in a relay means that the contacts in a contact set must be mechanically linked together so that it is impossible for the NO (normally open) and NC (normally closed) contacts to be closed at the same time. The contacts are linked so that no one contact in a relay can change state without changing all the contacts in that relay. There must be a 0.5 mm minimum air gap between the open contacts for the entire service life of the relay, even in the case of a failure. The force guidance of the relay contacts must always be preserved, even when a relay part fails to function correctly.

Our technical experts welcome the opportunity to answer your technical questions and provide solutions to your automation and control problems. Give us a call or visit www.altechcorp.com.

Quality Commitment
Altech’s control components meet diverse national and international standards such as UL, NEC, CSA, IEC, VDE and more. Altech provides superior customer service and delivery through Total Quality Management and Continuous Process Improvement. Altech is ISO 9001 approved. We perform these services with honesty and integrity and are committed to achieve these goals.
<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Pages</th>
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<tbody>
<tr>
<td>OA 5642/43/44</td>
<td>1 NO/1 NC, 2 NO/1 NC, 2 NO/2 NC, 3 NO/1 NC</td>
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<tr>
<td>OA 5611</td>
<td>2 NO/2 NC, 3 NO/1 NC</td>
<td>16-17</td>
</tr>
<tr>
<td>OA/OW 5669</td>
<td>1 NO/1 NC, 2 CO, 2 NO, 2 NC</td>
<td>6-7</td>
</tr>
<tr>
<td>OA 5612</td>
<td>2 NO/4 NC, 3 NO/3 NC, 4 NO/2 NC</td>
<td>18-19</td>
</tr>
<tr>
<td>OA/OW 5670</td>
<td>2 NO/2 NC, 3 NO/1 NC</td>
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<td>OA 5601</td>
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<td>3 NO/1 NC, 2 NO/2 NC</td>
<td>10-11</td>
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<td>OA 5602</td>
<td>2 NO/4 NC, 3 NO/3 NC, 4 NO/2 NC</td>
<td>22-23</td>
</tr>
<tr>
<td>OA 5603</td>
<td>7 NO/1 NC, 6 NO/2 NC, 5 NO/3 NC, 4 NO/4 NC, 3 NO/5 NC, 2 NO/6 NC</td>
<td>24-25</td>
</tr>
<tr>
<td>OA 5667 / OA 5667S</td>
<td>1 NO/1 NC, 2 CO</td>
<td>14-15</td>
</tr>
<tr>
<td>Safety Relay Modules</td>
<td></td>
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</tr>
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<td>Bussed Channel</td>
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<td>Isolated Channel</td>
<td></td>
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</tr>
</tbody>
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Safety Relay
OA 5642/43/44

Features
- 2-4 output contacts
- International approvals: TÜV, UL, cUL
- Quality control check for each safety relay
- Forced-guided contacts, all gold flash plated
- Contact Gap > 0.5 mm throughout life of relay
- Various contact materials, mixed contact material optional
- High coil voltage range
- High switching voltage
- High breakdown voltage: contact/coil ≥ 4 KV
- contact/contact ≥ 4KV
- High creeping distance: contact/coil ≥ 5.5 mm
- Contact Material AgNi10+0.2µmAu, AgSnO2+0.2µmAu, AgNi10+5µmAu
- Protection Rating IP67, washable
- Compact size- ony 10.3 mm height
- SMD component can be mounted under relay
- Custom design available, - coil voltage - operate/release time
- - contact pressure - coil resistance
- Nominal Coil Voltage ..............................................6, 12, 21, 24, 48, 60, 110, DC
- Coil Power Dissipation .......................................0.4/0.5/0.65 W
- Max. Switching Voltage .................................250V DC, 400 V AC
- Max. Switching Current ..........................................8 A
- Max. Switching Power — DC .................................240W
- Max. Switching Power — AC .................................2000VA
- Contact Switching Rate .................................20 operations per second
- Relay Operate Time ..............................................≤ 15 ms
- Relay Release Time ..............................................≤ 5 ms
- Operation Vibration ..............................................0.5 mm Ampl. max
- @ 10...100Hz, 3g max
- Protection Rating ..............................................IP 67
- Contact Arrangements .................................1NO/1NC, 2NO/1NC, 2NO/2NC, 3NO/1NC,
- Contact Material ..............................................AgNi10+0.2µmAu, AgSnO2+0.2µmAu, AgNi10+5µmAu
- Mechanical Life ..............................................>40x10^6 operation cycles
- Electrical Life ..............................................>50,000
- Ambient Temperature ............................................40...+85°C
- Cover Material ..............................................Thermoplast
- Weight ..............................................14/15/16 g
- More detailed data upon request

Technical Data

<table>
<thead>
<tr>
<th>Nominal Coil Voltage</th>
<th>6, 12, 21, 24, 48, 60, 110, DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coil Power Dissipation</td>
<td>0.4/0.5/0.65 W</td>
</tr>
<tr>
<td>Max. Switching Voltage</td>
<td>250V DC, 400 V AC</td>
</tr>
<tr>
<td>Max. Switching Current</td>
<td>8 A</td>
</tr>
<tr>
<td>Max. Switching Power — DC</td>
<td>240W</td>
</tr>
<tr>
<td>Max. Switching Power — AC</td>
<td>2000VA</td>
</tr>
<tr>
<td>Contact Switching Rate</td>
<td>20 operations per second</td>
</tr>
<tr>
<td>Relay Operate Time</td>
<td>≤ 15 ms</td>
</tr>
<tr>
<td>Relay Release Time</td>
<td>≤ 5 ms</td>
</tr>
<tr>
<td>Operation Vibration</td>
<td>0.5 mm Ampl. max @ 10...100Hz, 3g max</td>
</tr>
<tr>
<td>Protection Rating</td>
<td>IP 67</td>
</tr>
<tr>
<td>Contact Arrangements</td>
<td>1NO/1NC, 2NO/1NC, 2NO/2NC, 3NO/1NC,</td>
</tr>
<tr>
<td>Contact Material</td>
<td>AgNi10+0.2µmAu, AgSnO2+0.2µmAu, AgNi10+5µmAu</td>
</tr>
<tr>
<td>Mechanical Life</td>
<td>&gt;40x10^6 operation cycles</td>
</tr>
<tr>
<td>Electrical Life</td>
<td>&gt;50,000</td>
</tr>
<tr>
<td>Ambient Temperature</td>
<td>40...+85°C</td>
</tr>
<tr>
<td>Cover Material</td>
<td>Thermoplast</td>
</tr>
<tr>
<td>Weight</td>
<td>14/15/16 g</td>
</tr>
<tr>
<td>More detailed data upon request</td>
<td></td>
</tr>
</tbody>
</table>

Diagrams

- Relay operation voltage vs. ambient temperature
- Operations = Operations (ohmic) x limitation factor F
- Maximum switching power curve

Limitation factor for inductive loads
Safety Relay OA 5642/43/44 Data

Relay Data

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Range</th>
<th>Resistance</th>
<th>1 NO/1 NC Type</th>
<th>2NO/1NC Type</th>
<th>3NO/1NC Type</th>
<th>2NO/2NC Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>6V</td>
<td>4.2 - 7.8V</td>
<td>90 Ω</td>
<td>56.OA42.0611</td>
<td>70 Ω</td>
<td>55 Ω</td>
<td>56.OA44.0631</td>
</tr>
<tr>
<td>12V</td>
<td>8.4 - 15.2V</td>
<td>370 Ω</td>
<td>56.OA42.1211</td>
<td>290 Ω</td>
<td>230 Ω</td>
<td>56.OA44.1231</td>
</tr>
<tr>
<td>21V</td>
<td>15.0 - 27.3V</td>
<td>1050 Ω</td>
<td>56.OA42.2111</td>
<td>840 Ω</td>
<td>680 Ω</td>
<td>56.OA44.2131</td>
</tr>
<tr>
<td>24V</td>
<td>16.8 - 31.2V</td>
<td>1450 Ω</td>
<td>56.OA42.2411</td>
<td>1150 Ω</td>
<td>900 Ω</td>
<td>56.OA44.2431</td>
</tr>
<tr>
<td>48V</td>
<td>33.6 - 62.4V</td>
<td>6000 Ω</td>
<td>56.OA42.4811</td>
<td>4600 Ω</td>
<td>3600 Ω</td>
<td>56.OA44.4831</td>
</tr>
<tr>
<td>60V</td>
<td>42.0 - 78.0V</td>
<td>9250 Ω</td>
<td>56.OA42.6011</td>
<td>7100 Ω</td>
<td>5600 Ω</td>
<td>56.OA44.6031</td>
</tr>
<tr>
<td>110V</td>
<td>77.0 - 143.0V</td>
<td>31000 Ω</td>
<td>56.OA42.1111</td>
<td>24000 Ω</td>
<td>18500 Ω</td>
<td>56.OA44.1131</td>
</tr>
</tbody>
</table>

Contact Material, Example:

- C AgSnO₂+.2µmAu
- N AgNi10+.2µmAu
- S AgNi10+5µmAu

Ordering Information

Dimensions & Pin Configurations

5642

5643

5644

Note: All dimensions are shown in millimeters. To convert to inches, divide by 25.4.
Safety Relay
OA/OW 5669

Features
- 2 output contacts
- International approvals: TÜV, UL, cUL
- Quality control check for each safety relay
- Forced-guided contacts, all gold flash plated
- Contact Gap > 0.5 mm throughout life of relay
- Various contact materials, mixed contact material optional
- High coil voltage range
- High breakdown voltage: contact/coil ≥ 4 KV contact/contact ≥ 4KV
- High creeping distance: contact/coil ≥ 8 mm contact/contact ≥ 5.5 mm

Protection Rating
OA Version: IP 40, flow solder proof
OW Version: IP 67, washable
- Custom design available,
  - coil voltage
  - coil resistance,
  - contact pressure
  - operate/release time

Technical Data
- Nominal Coil Voltage........................................... 6, 12, 20, 24, 48, 60, 110, DC
  Coil Power Dissipation........................................ 0.7 W
- Max. Switching Voltage......................... 250V DC, 400V AC
- Max. Switching Current................. 8 A (2 x 5A simultaneous)
- Max. Switching Power — DC................................. 200W (2 x 160W simultaneous)
- Max. Switching Power — AC................................. 2000VA (2 x 1250VA simultaneous)
- Contact Switching Rate ........... 10 operations per second
- Relay Operate Time ........................................... ≤ 15 ms
- Relay Release Time ........................................... ≤ 12 ms
- Operation Vibration................................. 0.35 mm Ampl. max @ 10...55Hz, 5g max
- Contact Arrangements ...... 1NO/1NC, 2CO, 2NO*, 2NC*
- Contact Material.................. AgNi10+0.2µmAu Standard
  AgSnO2+0.2µmAu, AgNi10+5µmAu Optional
- Mechanical Life ........................... ≥ 50x10⁶ operation cycles
- Electrical Life ........................... AgSnO₂ >2x10⁵, AgNi10 >10⁵
  operation cycles @ 230V AC, 6A, cos ϕ=1
- Ambient Temperature.................. -40...+70°C
- Cover Material....................... Polyamide 6
- Weight............................................. 15 g
- More detailed data upon request

Diagrams
- Relay operation voltage vs. ambient temperature
- Limitation factor for inductive loads
- Maximum switching power curve
- Mechanical life

*Special order.
Safety Relay OA/OW 5669 Data

### Relay Data

<table>
<thead>
<tr>
<th>Rated Voltage</th>
<th>Voltage Range</th>
<th>Coil Resistance (10%)</th>
<th>1 NO/1 NC Type</th>
<th>2 CO Type</th>
<th>2 NO* Type</th>
<th>2 NC* Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>10V</td>
<td>8.0 - 16.0V</td>
<td>150 Ω</td>
<td>56.O69.1011</td>
<td>56.O69.1000</td>
<td>56.O69.1020</td>
<td>56.O69.1002</td>
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<tr>
<td>48V</td>
<td>38.4 - 76.8V</td>
<td>3200 Ω</td>
<td>56.O69.4811</td>
<td>56.O69.4800</td>
<td>56.O69.4820</td>
<td>56.O69.4802</td>
</tr>
<tr>
<td>60V</td>
<td>48.0 - 96.0V</td>
<td>5200 Ω</td>
<td>56.O69.6011</td>
<td>56.O69.6000</td>
<td>56.O69.6020</td>
<td>56.O69.6002</td>
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<tr>
<td>110V</td>
<td>88.0 - 176.0V</td>
<td>18000 Ω</td>
<td>56.O69.1111</td>
<td>56.O69.1100</td>
<td>56.O69.1120</td>
<td>56.O69.1102</td>
</tr>
</tbody>
</table>

### Footprints (solder side)

**1 NO/1 NC**

**2 CO**

**2 NO**

**2 NC**

### Dimensions

Note: All dimensions are shown in millimeters. To convert to inches, divide by 25.4.

*Special order.*
Safety Relay
OA/OW 5670

Features
- 4 output contacts
- International approvals: TÜV, UL, cUL
- Quality control check for each safety relay
- Forced-guided contacts, all gold flash plated
- Contact Gap > 0.5 mm throughout life of relay
- Various contact materials, mixed contact material optional
- High coil voltage range
- High breakdown voltage: contact/coil ≥ 4 KV
  contact/contact ≥ 3KV
- High creeping distance: contact/coil ≥ 8 mm
  contact/contact ≥ 4.5 mm
- Protection Rating
  OA Version: IP 40, flow solder proof
  OW Version: IP 67, washable
- Custom design available,
  - coil voltage
  - coil resistance,
  - contact pressure
  - operate/release time

Technical Data
- Nominal Coil Voltage ....................................................6, 12, 24, 48, 60, 110, DC
- Coil Power Dissipation ...........................................1.0 W
- Max. Switching Voltage ........................................250V DC, 400V AC
- Max. Switching Current ..............................6 A (3 x 6A simultaneous)
- Max. Switching Power — DC ...........................................160W
- Max. Switching Power — AC .....................................1500VA
- Contact Switching Rate .................10 operations per second
- Relay Operate Time ..............................................11 ms
- Relay Release Time .................................................6 ms
- Operation Vibration ..............................................0.35 mm Ampli. max
  @ 10...200Hz, 5g max

Contact Arrangements ..........................2NO/2NC, 3NO/1NC
Contact Material ..............................AgNi10+0.2µmAu Standard
................................AgSnO2+0.2µmAu, AgNi10+5µmAu Optional
Mechanical Life..........................≥50x10^6 operation cycles
Electrical Life ..............................AgSnO2 >2x10^6, AgNi10 >1.2x10^6
  operation cycles @ 230V AC, 6A, cos φ=1
Ambient Temperature ..............................-40...+75°C
Cover Material ..............................Polyamide 6
Weight .........................................................20 g
More detailed data upon request

Diagrams
Relay operation voltage vs. ambient temperature
Limitation factor for inductive loads
Maximum switching power curve
Mechanical life
## Safety Relay OA/OW 5670 Data

### Relay Data

<table>
<thead>
<tr>
<th>Rated Voltage</th>
<th>Voltage Range</th>
<th>Coil Resistance (Ω)</th>
<th>2 NO/2 NC Type</th>
<th>3 NO/1 NC Type</th>
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</thead>
<tbody>
<tr>
<td>6V</td>
<td>4.2 - 8.4V</td>
<td>36 Ω</td>
<td>56.O 70.0622</td>
<td>56.O 70.0631</td>
</tr>
<tr>
<td>12V</td>
<td>8.4 - 16.8V</td>
<td>150 Ω</td>
<td>56.O 70.1222</td>
<td>56.O 70.1231</td>
</tr>
<tr>
<td>20V</td>
<td>14.0 - 28.0V</td>
<td>400 Ω</td>
<td>56.O 70.2022</td>
<td>56.O 70.2031</td>
</tr>
<tr>
<td>24V</td>
<td>16.8 - 33.6V</td>
<td>580 Ω</td>
<td>56.O 70.2422</td>
<td>56.O 70.2431</td>
</tr>
<tr>
<td>48V</td>
<td>33.6 - 67.2V</td>
<td>2300 Ω</td>
<td>56.O 70.4822</td>
<td>56.O 70.4831</td>
</tr>
<tr>
<td>60V</td>
<td>42.0 - 84.0V</td>
<td>3600 Ω</td>
<td>56.O 70.6022</td>
<td>56.O 70.6031</td>
</tr>
<tr>
<td>110V</td>
<td>77.0 - 154.0V</td>
<td>12100 Ω</td>
<td>56.O 70.1122</td>
<td>56.O 70.1131</td>
</tr>
</tbody>
</table>

### Ordering Information

- **Safety Relay OA/OW 5670 Data**
  - Contact Material, Example: C AgSnO₂+.2µmAu
  - N AgNi10+.2µmAu
  - S AgNi0.15+5µmAu

### Footprints (solder side)

![Footprints](image)

### Dimensions

![Dimensions](image)

Note: All dimensions are shown in millimeters. To convert to inches, divide by 25.4.
Safety Relay
OA 5621 / OA 5621S

Features

- 4 output contacts
- International approvals: TÜV, UL, cUL
- Quality control check for each safety relay
- Forced-guided contacts, all gold flash plated
- Contact Gap > 0.5 mm throughout life of relay
- Various contact materials, mixed contact material optional
- High coil voltage range
- High breakdown voltage: contact/coil ≥ 4 KV
- High creeping distance: contact/coil ≥ 5.5 mm
- Protection Rating IP 67, washable
- Custom design available,
  - coil voltage
  - coil resistance,
  - contact pressure
  - operate/release time
  - gold plated double contacts
- S-Type
  - higher external clearance and creeping distance: contact/contact ≥ 7.5 mm

Technical Data

- **Nominal Coil Voltage**: 6, 12, 24, 48, 60, 110, DC
- **Coil Power Dissipation**: 0.6 W
- **Max. Switching Voltage**: 250V DC, 400V AC
- **Max. Switching Current**: 8 A (3 x 8A simultaneous)
- **Max. Switching Power — DC**: 200W
- **Max. Switching Power — AC**: 2000VA
- **Contact Switching Rate**: 10 operations per second
- **Relay Operate Time**: 12 ms
- **Relay Release Time**: 8 ms
- **Operation Vibration**: 0.35 mm Ampl. max @ 10...200Hz, 5g max
- **Contact Arrangements**: 3NO/1NC, 2NO/2NC
- **Contact Material**: AgNi10+0.2µmAu Standard, AgSnO2+0.2µmAu, AgNi10+5µmAu Optional
- **Mechanical Life**: >2x10^6 operation cycles
- **Electrical Life**: AgSnO2 >1.5x10^5, AgNi10 >1.0x10^5
- **Ambient Temperature**: -40...+80°C
- **Cover Material**: Polyamide 6
- **Weight**: 35 g
- **More detailed data upon request**

Diagrams

- Relay operation voltage vs. ambient temperature
- Limitation factor for inductive loads
- Maximum switching power curve
- Switching capacity P (kVA)
- Mechanical life
## Safety Relay OA 5621 / OA 5621S Data

### Relay Data

<table>
<thead>
<tr>
<th>Rated Voltage</th>
<th>Voltage Range</th>
<th>Coil Resistance (10%)</th>
<th>3 NO/1 NC Type</th>
<th>2 NO/2 NC Type</th>
<th>3 NO/1 NC Type</th>
<th>2 NO/2 NC Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>6V</td>
<td>4.5 - 8.4V</td>
<td>60 Ω</td>
<td>56.OA21.0631</td>
<td>56.OA21.0622</td>
<td>56.OA21S.0631</td>
<td>56.OA21S.0622</td>
</tr>
<tr>
<td>24V</td>
<td>18.0 - 33.6V</td>
<td>960 Ω</td>
<td>56.OA21.2431</td>
<td>56.OA21.2422</td>
<td>56.OA21S.2431</td>
<td>56.OA21S.2422</td>
</tr>
<tr>
<td>60V</td>
<td>45.0 - 84.0V</td>
<td>6000 Ω</td>
<td>56.OA21.6031</td>
<td>56.OA21.6022</td>
<td>56.OA21S.6031</td>
<td>56.OA21S.6022</td>
</tr>
<tr>
<td>110V</td>
<td>82.5 - 154.0V</td>
<td>20000 Ω</td>
<td>56.OA21.1131</td>
<td>56.OA21.1122</td>
<td>56.OA21S.1131</td>
<td>56.OA21S.1122</td>
</tr>
</tbody>
</table>

### Ordering Information

- **Contact Material, Example:**
  - AgSnO\(_2\)+.2μmAu
  - AgNi10+.2μmAu
  - AgNi10+5μmAu

### Footprints (solder side)

- 2NO/2NC, S-Type
- 3NO/1NC
- 3NO/1NC, S-Type
- 2NO/2NC

### Dimensions

- **S-Type**

Note: All dimensions are shown in millimeters. To convert to inches, divide by 25.4.
## Safety Relay
### OA 5622 / OA 5622S

### Features
- 6 output contacts
- International approvals: TÜV, UL, cUL
- Quality control check for each safety relay
- Forced-guided contacts, all gold flash plated
- Contact Gap > 0.5 mm throughout life of relay
- Various contact materials, mixed contact material optional
- High coil voltage range
- High breakdown voltage: contact/coil ≥ 4 KV
- Contact/contact ≥ 4KV
- High creeping distance: contact/coil ≥ 5.5 mm
- Protection Rating IP 67, washable
- Custom design available,
  - coil voltage
  - coil resistance,
  - contact pressure
  - operate/release time
  - gold plated double contacts
- S-Type
  - higher external clearance and creeping distance: contact/contact ≥ 7.5 mm

### Technical Data

<table>
<thead>
<tr>
<th>Nominal Coil Voltage</th>
<th>6, 12, 24, 48, 60, 110, DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coil Power Dissipation</td>
<td>0.8 W</td>
</tr>
<tr>
<td>Max. Switching Voltage</td>
<td>250V DC, 400V AC</td>
</tr>
<tr>
<td>Max. Switching Current</td>
<td>8 A (5 x 8A simultaneous)</td>
</tr>
<tr>
<td>Max. Switching Power — DC</td>
<td>200W</td>
</tr>
<tr>
<td>Max. Switching Power — AC</td>
<td>2000VA</td>
</tr>
<tr>
<td>Contact Switching Rate</td>
<td>10 operations per second</td>
</tr>
<tr>
<td>Relay Operate Time</td>
<td>12 ms</td>
</tr>
<tr>
<td>Relay Release Time</td>
<td>8 ms</td>
</tr>
<tr>
<td>Operation Vibration</td>
<td>0.35 mm Ampl. max</td>
</tr>
<tr>
<td>Contact Arrangements</td>
<td>2NO/4NC, 3NO/3NC, 4NO/2NC, 5NO/1NC</td>
</tr>
<tr>
<td>Contact Material</td>
<td>AgNi10+0.2µmAu Standard, AgSnO2+0.2µmAu, AgNi10+5µmAu Optional</td>
</tr>
<tr>
<td>Mechanical Life</td>
<td>&gt;20x10^6 operation cycles</td>
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<tr>
<td>Electrical Life</td>
<td>AgSnO_2 &gt;10^5, AgNi10 &gt;0.75x10^6</td>
</tr>
<tr>
<td>Ambient Temperature</td>
<td>-40...+80°C</td>
</tr>
<tr>
<td>Cover Material</td>
<td>Polyamide 6</td>
</tr>
<tr>
<td>Weight</td>
<td>38 g</td>
</tr>
</tbody>
</table>

### More detailed data upon request

### Diagrams

- Relay operation voltage vs. ambient temperature
- Limitation factor for inductive loads
- Maximum switching power curve
- Mechanical life
Safety Relay OA 5622 / OA 5622S Data

<table>
<thead>
<tr>
<th>Rated Voltage</th>
<th>Voltage Range</th>
<th>Coil Resistance (10%)</th>
<th>2 NO/4 NC Type</th>
<th>3 NO/3 NC Type</th>
<th>4 NO/2 NC Type</th>
<th>5 NO/1 NC Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>6V</td>
<td>4.5 - 8.4V</td>
<td>38 Ω</td>
<td>56.OA22.0624</td>
<td>45 Ω</td>
<td>56.OA22.0633</td>
<td>56.OA22.0642</td>
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<td>56.OA22.0651</td>
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<tr>
<td>12V</td>
<td>9.0 - 16.8V</td>
<td>150 Ω</td>
<td>56.OA22.1224</td>
<td>180 Ω</td>
<td>56.OA22.1233</td>
<td>56.OA22.1242</td>
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<td></td>
<td>56.OA22.1251</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24V</td>
<td>18.0 - 33.6V</td>
<td>600 Ω</td>
<td>56.OA22.2424</td>
<td>720 Ω</td>
<td>56.OA22.2433</td>
<td>56.OA22.2442</td>
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<td></td>
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<tr>
<td>48V</td>
<td>36.0 - 67.2V</td>
<td>2400 Ω</td>
<td>56.OA22.4824</td>
<td>2880 Ω</td>
<td>56.OA22.4833</td>
<td>56.OA22.4842</td>
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<td>56.OA22.4851</td>
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<td>60V</td>
<td>45.0 - 84.0V</td>
<td>3800 Ω</td>
<td>56.OA22.6024</td>
<td>4500 Ω</td>
<td>56.OA22.6033</td>
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<tr>
<td>110V</td>
<td>82.5 - 154.0V</td>
<td>12700 Ω</td>
<td>56.OA22.1124</td>
<td>15125 Ω</td>
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<td>56.OA22.1142</td>
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<td>56.OA22.1151</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

For S-Type:

Please specify S when ordering:

Example: 56.OA22S._ _ _

Contact Material, Example: C AgSnO$_2$+.2µmAu
N AgNi10+.2µmAu
S AgNi10+5µmAu

Footprints (solder side)

Dimensions

Note: All dimensions are shown in millimeters. To convert to inches, divide by 25.4.
Safety Relay
OA 5667 / OA 5667S

Features
- 2 output contacts
- International approvals: TÜV, UL, cUL
- Quality control check for each safety relay
- Forced-guided contacts, all gold flash plated
- Contact Gap > 0.5 mm throughout life of relay
- Various contact materials, mixed contact material optional
- High coil voltage range
- High breakdown Voltage:
  - contact/coil ≥ 4 KV
  - contact/contact ≥ 2.5 KV
  - contact/contact ≥ 4 KV; S-Type
- High Creeping Distance:
  - contact/coil > 8 mm
  - contact/contact > 4.5 mm; S-Type 8.5 mm
- Custom design available,
  - coil voltage, coil resistance,
  - contact pressure, operate/release time

Technical Data
- Nominal Coil Voltage.................................6, 12, 24, 48, 60, 110 DC
- Coil Power Dissipation..............................0.75 W
- Max. Switching Voltage .........................250V DC, 400V AC
- Max. Switching Current .................6A (2 x 6A simultaneous)
- Max. Switching Power — DC ..................200W (2 x 160W simultaneous)
- Max. Switching Power — AC ....................1500VA (2 x1500VA simultaneous)
- Contact Switching Rate...............10 operations per second
- Relay Operate Time ..............................10 ms
- Relay Release Time ..............................6 ms
- Operation Vibration ..............................0.35 mm Ampl. max
- Contact Arrangements ......................1 NO/1 NC, 2CO
- Contact Material..............................AgNi10+0.2µmAu Standard
  - AgSnO2+0.2µmAu, AgNi10+5µmAu Optional
- Mechanical Life ...............................≥10⁷ operation cycles
- Electrical Life ..............................AgSnO₂ >1.25x10⁵, AgNi10 >10⁵
- Ambient Temperature .....................-40...+75°C
- Protection Rating.................................IP40
- Cover Material.................................Thermoplast
- Weight........................................16 g
- More detailed data upon request

Diagrams
- Relay operation voltage vs. ambient temperature
- Limitation factor for inductive loads
- Maximum switching power curve
- Mechanical life
Safety Relay OA 5667/ OA 5667S Data

<table>
<thead>
<tr>
<th>Rated Voltage</th>
<th>Voltage Range</th>
<th>Coil Resistance (10%)</th>
<th>1 NO/1 NC Type</th>
<th>2 CO Type</th>
<th>1 NO/1 NC S-Type</th>
<th>2 CO S-Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>6V</td>
<td>4.5 - 7.8V</td>
<td>48 Ω</td>
<td>56.OA67.0611</td>
<td>56.OA67.0600</td>
<td>56.OA67.0611</td>
<td>56.OA67S.0600</td>
</tr>
<tr>
<td>48V</td>
<td>36.0 - 62.4V</td>
<td>3200 Ω</td>
<td>56.OA67.4811</td>
<td>56.OA67.4800</td>
<td>56.OA67.4811</td>
<td>56.OA67S.4800</td>
</tr>
<tr>
<td>60V</td>
<td>45.0 - 78.0V</td>
<td>4700 Ω</td>
<td>56.OA67.6011</td>
<td>56.OA67.6000</td>
<td>56.OA67.6011</td>
<td>56.OA67S.6000</td>
</tr>
<tr>
<td>110V</td>
<td>82.5 - 143.5V</td>
<td>15300 Ω</td>
<td>56.OA67.1111</td>
<td>56.OA67.1100</td>
<td>56.OA67.1111</td>
<td>56.OA67S.1100</td>
</tr>
</tbody>
</table>

Note: All dimensions are shown in millimeters. To convert to inches, divide by 25.4.

Footprints (solder side)

Dimensions

Contact Material, Example: 

- AgSnO₂+2µmAu
- AgNi10+.2µmAu
- AgNi10+5µmAu
Safety Relay
OA 5611

Features
- 4 output contacts
- International approvals: TÜV, UL, cUL
- Quality control check for each safety relay
- Forced-guided contacts, all gold flash plated
- Contact Gap > 0.5 mm throughout life of relay
- Various contact materials, mixed contact material optional
- High coil voltage range
- High switching voltage
- High breakdown voltage: contact/coil ≥ 4 KV
  contact/contact ≥ 2.5KV
- High creeping distance: contact/coil ≥ 8 mm
  contact/contact ≥ 4.5 mm
- Crown contacts
- Solid connection between coil and contact housing
- Compact size
- Custom design available,
  - coil voltage - IP67 washable
  - contact pressure - coil resistance
  - operate/release time
  - low power dissipation models
  - Manual test relay (slide activated)

Technical Data
- Nominal Coil Voltage: 6, 12, 24, 48, 60, 110, DC
- Coil Power Dissipation: 0.6 W
- Max. Switching Voltage: 250V DC, 400V AC
- Max. Switching Current: 8 A
- Max. Switching Power — DC: 200W
- Max. Switching Power — AC: 2000VA
- Contact Switching Rate: 10 operations per second
- Relay Operate Time: 20 ms
- Relay Release Time: 6 ms
- Operation Vibration: 0.35 mm Ampl. max
  @ 10...200Hz, 3g max
- Protection Rating: IP 40
- Contact Arrangements: 2NO/2NC, 3NO/1NC
- Contact Material: AgNi10+0.2µmAu, AgSnO2+0.2µmAu, AgNi10+5µmAu
- Mechanical Life: ≥50x10⁶ operation cycles
- Electrical Life: AgSnO2 >1.5x10⁵, AgNi10 >10⁵
  operation cycles @ 230V AC, 8A, cos ϕ=1
- Ambient Temperature: -40...+85°C
- Cover Material: Thermoplas
- Weight: 35 g
- More detailed data upon request

Diagrams
- Relay operation voltage vs. ambient temperature
- Limitation factor for inductive loads
- Maximum switching power curve
- Mechanical life
Safety Relay OA 5611 Data

<table>
<thead>
<tr>
<th>Rated Voltage</th>
<th>Voltage Range</th>
<th>Coil Resistance (Ω)</th>
<th>2 NO/2 NC Type</th>
<th>3 NO/1 NC Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>6V</td>
<td>4.2 - 8.4V</td>
<td>56</td>
<td>56.OA11.0622</td>
<td>56.OA11.0631</td>
</tr>
<tr>
<td>12V</td>
<td>8.4 - 16.8V</td>
<td>240</td>
<td>56.OA11.1222</td>
<td>56.OA11.1231</td>
</tr>
<tr>
<td>24V</td>
<td>16.8 - 33.6V</td>
<td>960</td>
<td>56.OA11.2422</td>
<td>56.OA11.2431</td>
</tr>
<tr>
<td>48V</td>
<td>33.6 - 67.2V</td>
<td>3840</td>
<td>56.OA11.4822</td>
<td>56.OA11.4831</td>
</tr>
<tr>
<td>60V</td>
<td>42.0 - 84.0V</td>
<td>6000</td>
<td>56.OA11.6022</td>
<td>56.OA11.6031</td>
</tr>
<tr>
<td>110V</td>
<td>77.0 - 154.0V</td>
<td>20150</td>
<td>56.OA11.1122</td>
<td>56.OA11.1131</td>
</tr>
</tbody>
</table>

Contact Material, Example: 
- C AgSnO₂⁺,2μmAu
- N AgNi₁₀⁺,2μmAu
- S AgNi₁₀⁺5μmAu

Footprints (solder side)

Dimensions

Note: All dimensions are shown in millimeters. To convert to inches, divide by 25.4.
Safety Relay
OA 5612

Features
- 6 output contacts
- International approvals: TÜV, UL, cUL
- Quality control check for each safety relay
- Forced-guided contacts, all gold flash plated
- Contact Gap > 0.5 mm throughout life of relay
- Various contact materials, mixed contact material optional
- High coil voltage range
- Very high switching voltage
- High breakdown voltage: contact/coil ≥ 4 KV
  contact/contact ≥ 2.5KV
- High creeping distance: contact/coil ≥ 8 mm
  contact/contact ≥ 4.5 mm
- Crown contacts
- Solid connection between coil and contact housing
- Compact size
- Custom design available, -coil voltage -IP67 washable
  -contact pressure -coil resistance
  -operate/release time
  -low power dissipation models

Technical Data
- Nominal Coil Voltage ...............................................6, 12, 24, 48, 60, 110, DC
- Coil Power Dissipation ............................................0.8 - 1.0 W
- Max. Switching Voltage ............................250V DC, 400V AC
- Max. Switching Current ...............................8 A
- Max. Switching Power—DC ..........................200W
- Max. Switching Power—AC ........................2000VA
- Contact Switching Rate ..............10 operations per second
- Relay Operate Time ..............................................20 ms
- Relay Release Time .............................................6 ms
- Operation Vibration ......................................0.35 mm Ampl. max
  .................................................................@ 10...200Hz, 3g max
- Protection Rating ..................................................IP 40
- Contact Arrangements .................................2NO/4NC, 3NO/3NC, 4NO/2NC
- Contact Material ...............................................AgNi10+0.2µmAu, AgSnO2 +0.2µmAu, AgNi10+5µmAu
- Mechanical Life ................................................50x10⁶ operation cycles
- Electrical Life ........................................AgSnO₂ >1.5x10⁵, AgNi10 >10⁵ operation cycles @ 230V AC, 8A, cos ϕ=1
- Ambient Temperature ........................................-40...+85°C
- Cover Material ................................................Thermoplast
- Weight .................................................................38 g
- More detailed data upon request

Diagrams
- Relay operation voltage vs. ambient temperature
- Limitation factor for inductive loads
- Maximum switching power curve
- Mechanical life
### Relay Data

<table>
<thead>
<tr>
<th>Rated Voltage</th>
<th>Voltage Range</th>
<th>Coil Resistance (10%)</th>
<th>2 NO/4 NC Type</th>
<th>3 NO/3 NC Type</th>
<th>4 NO/2 NC Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>6V</td>
<td>4.2 - 8.4V</td>
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<td>56.OA12.0624</td>
<td>45 Ω</td>
<td>56.OA12.0642</td>
</tr>
<tr>
<td>12V</td>
<td>8.4 - 16.8V</td>
<td>145 Ω</td>
<td>56.OA12.1224</td>
<td>180 Ω</td>
<td>56.OA12.1242</td>
</tr>
<tr>
<td>24V</td>
<td>16.8 - 33.6V</td>
<td>600 Ω</td>
<td>56.OA12.2424</td>
<td>720 Ω</td>
<td>56.OA12.2442</td>
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<tr>
<td>48V</td>
<td>33.6 - 67.2V</td>
<td>2300 Ω</td>
<td>56.OA12.4824</td>
<td>2880 Ω</td>
<td>56.OA12.4842</td>
</tr>
<tr>
<td>60V</td>
<td>42.0 - 84.0V</td>
<td>3600 Ω</td>
<td>56.OA12.6024</td>
<td>4500 Ω</td>
<td>56.OA12.6042</td>
</tr>
<tr>
<td>110V</td>
<td>77.0 - 154.0V</td>
<td>12100 Ω</td>
<td>56.OA12.1124</td>
<td>15125 Ω</td>
<td>56.OA12.1142</td>
</tr>
</tbody>
</table>

**Note:** All dimensions are shown in millimeters. To convert to inches, divide by 25.4.

### Ordering Information

<table>
<thead>
<tr>
<th>Rated Voltage</th>
<th>Voltage Range</th>
<th>Coil Resistance (10%)</th>
<th>2 NO/4 NC Type</th>
<th>3 NO/3 NC Type</th>
<th>4 NO/2 NC Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>6V</td>
<td>4.2 - 8.4V</td>
<td>36 Ω</td>
<td>56.OA12.0624</td>
<td>45 Ω</td>
<td>56.OA12.0642</td>
</tr>
<tr>
<td>12V</td>
<td>8.4 - 16.8V</td>
<td>145 Ω</td>
<td>56.OA12.1224</td>
<td>180 Ω</td>
<td>56.OA12.1242</td>
</tr>
<tr>
<td>24V</td>
<td>16.8 - 33.6V</td>
<td>600 Ω</td>
<td>56.OA12.2424</td>
<td>720 Ω</td>
<td>56.OA12.2442</td>
</tr>
<tr>
<td>48V</td>
<td>33.6 - 67.2V</td>
<td>2300 Ω</td>
<td>56.OA12.4824</td>
<td>2880 Ω</td>
<td>56.OA12.4842</td>
</tr>
<tr>
<td>60V</td>
<td>42.0 - 84.0V</td>
<td>3600 Ω</td>
<td>56.OA12.6024</td>
<td>4500 Ω</td>
<td>56.OA12.6042</td>
</tr>
<tr>
<td>110V</td>
<td>77.0 - 154.0V</td>
<td>12100 Ω</td>
<td>56.OA12.1124</td>
<td>15125 Ω</td>
<td>56.OA12.1142</td>
</tr>
</tbody>
</table>

### Footprints (solder side)

#### 2 NO/4 NC

![Footprint Diagram](2 NO/4 NC Diagram)

#### 3 NO/3 NC

![Footprint Diagram](3 NO/3 NC Diagram)

#### 4 NO/2 NC

![Footprint Diagram](4 NO/2 NC Diagram)

### Contact Material, Example:

- C AgSnO₂+.2µmAu
- AgNi10+.2µmAu
- AgNi10+5µmAu

### Dimensions

![Dimensions Diagram](Dimensions Diagram)

**Note:** All dimensions are shown in millimeters. To convert to inches, divide by 25.4.
Safety Relay
OA 5601

Features
- 4 output contacts
- International approvals: TÜV, UL, cUL
- Quality control check for each safety relay
- Forced-guided contacts, all gold flash plated
- Contact gap > 0.5 mm throughout life of relay
- Various contact materials, mixed contact material optional
- High coil voltage range
- High switching voltage
- High breakdown voltage: contact/coil ≥ 4 KV contact/contact ≥ 4KV
- High creeping distance: contact/coil ≥ 8 mm contact/contact ≥ 5.5 mm
- Crown contacts
- Solid connection between coil and contact housing
- Custom design available, -coil voltage -coil resistance,
  -contact pressure -operate/release time
  -IP67 washable

Technical Data
- Nominal Coil Voltage .......................................................... 6,12, 24, 48, 60, 110, DC
- Coil Power Dissipation .................................................. 0.75 W
- Max. Switching Voltage ........................................ 250V DC, 400V AC
- Max. Switching Current ............................................... 10 A
- Max. Switching Power—DC ........................................... 240W
- Max. Switching Power—AC ........................................... 2500VA
- Contact Switching Rate ........... 10 operations per second
- Relay Operate Time ...................................................... 27 ms
- Relay Release Time .................................................... 5 ms
- Operation Vibration ...................................................... 0.35 mm Ampl. max
- Contact Arrangements ...................... 2NO/2NC, 3NO/1NC
- Contact Material........................................... AgSnO₂+0.2μmAu, AgNi10+0.2μmAu, AgNi10+5μmAu
- Mechanical Life .............................................. >30x10⁶ operation cycles
- Electrical Life ................................. AgSnO₂ >3x10⁶, AgNi10 >2x10⁶
- Operation cycles @ 230V AC, 10A, cos ϕ =1
- Ambient Temperature .................. -40...+85°C
- Protection Rating ........................................ IP 40
- Cover Material ........................................... Thermoplasit
- Weight ................................................................. 78 g
- More detailed data upon request

Diagrams
- Relay operation voltage vs. ambient temperature
- Limitation factor for inductive loads
- Maximum switching power curve
- Mechanical life
### Safety Relay OA 5601 Data

<table>
<thead>
<tr>
<th>Rated Voltage</th>
<th>Voltage Range</th>
<th>Coil Resistance (Ω)</th>
<th>2 NO/2 NC Type</th>
<th>3 NO/1 NC Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>6V</td>
<td>4.2 - 9.6V</td>
<td>48 Ω</td>
<td>56.OA01.0622</td>
<td>56.OA01.0631</td>
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<tr>
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<td>8.4 - 19.2V</td>
<td>192 Ω</td>
<td>56.OA01.1222</td>
<td>56.OA01.1231</td>
</tr>
<tr>
<td>24V</td>
<td>16.8 - 38.4V</td>
<td>770 Ω</td>
<td>56.OA01.2422</td>
<td>56.OA01.2431</td>
</tr>
<tr>
<td>48V</td>
<td>33.6 - 76.8V</td>
<td>2880 Ω</td>
<td>56.OA01.4822</td>
<td>56.OA01.4831</td>
</tr>
<tr>
<td>60V</td>
<td>42.0 - 96.0V</td>
<td>4800 Ω</td>
<td>56.OA01.6022</td>
<td>56.OA01.6031</td>
</tr>
<tr>
<td>110V</td>
<td>77.0 - 176.0V</td>
<td>16000 Ω</td>
<td>56.OA01.1122</td>
<td>56.OA01.1131</td>
</tr>
</tbody>
</table>

Contact Material, Example: 
- **C AgSnO₂⁺.2µmAu**
- **N AgNi10+.2µmAu**
- **S AgNi10+5µmAu**

### Footprints (solder side)

**2 NO/2 NC**

**3 NO/1 NC**

### Dimensions

Note: All dimensions are shown in millimeters. To convert to inches, divide by 25.4.
Safety Relay
OA 5602

Features
- 6 output contacts
- International approvals: TÜV, UL, cUL
- Quality control check for each safety relay
- Forced-guided contacts, all gold flash plated
- Contact gap > 0.5 mm throughout life of relay
- Various contact materials, mixed contact material optional
- High coil voltage range
- High switching voltage
- High breakdown voltage: contact/coil ≥ 4 KV
  contact/contact ≥ 4KV
- High creeping distance: contact/coil ≥ 8 mm
  contact/contact ≥ 5.5 mm
- Crown contacts
- Solid connection between coil and contact housing
- Custom coil voltage available
- Custom design available,
  - coil voltage
  - coil resistance,
  - contact pressure
  - operate/release time
  - IP67 washable

Technical Data
- Nominal Coil Voltage .........................................................6, 12, 24, 48, 60, 110, DC
- Coil Power Dissipation ..................................................1.0 W
- Max. Switching Voltage ..................................................250V DC, 400V AC
- Max. Switching Current ..................................................10 A
- Max. Switching Power—DC ..........................................240W
- Max. Switching Power—AC ..........................................2500VA
- Contact Switching Rate ..........10 operations per second
- Relay Operate Time ......................................................27 ms
- Relay Release Time ......................................................5 ms
- Operation Vibration .........................0.35 mm Ampl. max
  @ 10...55Hz
- Protection Rating .........................................................IP 40
- Contact Arrangements ..................................................2NO/4NC, 3NO/3NC, 4NO/2NC
- Contact Material ........................................................AgSnO2+0.2µmAu, AgNi10+0.2µmAu, AgNi10+5µmAu
- Mechanical Life ........................................................>30x10⁵ Operation cycles
- Electrical Life ................AgSnO₂ >3x10⁵, AgNi10 >2x10⁵
  operation cycles @ 230V AC, 10A, cos Φ=1
- Ambient Temperature ......................................................-40...+85°C
- Cover Material ...............................................................Thermoplast
- Weight .............................................................85 g
- More detailed data upon request

Diagrams
- Relay operation voltage vs. ambient temperature
- Limitation factor for inductive loads
- Maximum switching power curve
- Mechanical life
## Safety Relay OA 5602 Data

### Relay Data

<table>
<thead>
<tr>
<th>Rated Voltage</th>
<th>Voltage Range</th>
<th>Coil Resistance (10%)</th>
<th>2 NO/4 NC Type</th>
<th>3 NO/3 NC Type</th>
<th>4 NO/2 NC Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>6V</td>
<td>4.2 - 9.6V</td>
<td>35 Ω</td>
<td>56.OA02.0624</td>
<td>56.OA02.0633</td>
<td>56.OA02.0642</td>
</tr>
<tr>
<td>12V</td>
<td>8.4 - 19.2V</td>
<td>140 Ω</td>
<td>56.OA02.1224</td>
<td>56.OA02.1233</td>
<td>56.OA02.1242</td>
</tr>
<tr>
<td>24V</td>
<td>16.8 - 38.4V</td>
<td>570 Ω</td>
<td>56.OA02.2424</td>
<td>56.OA02.2433</td>
<td>56.OA02.2442</td>
</tr>
<tr>
<td>48V</td>
<td>33.6 - 76.8V</td>
<td>2300 Ω</td>
<td>56.OA02.4824</td>
<td>56.OA02.4833</td>
<td>56.OA02.4842</td>
</tr>
<tr>
<td>60V</td>
<td>42.0 - 96.0V</td>
<td>3600 Ω</td>
<td>56.OA02.6024</td>
<td>56.OA02.6033</td>
<td>56.OA02.6042</td>
</tr>
<tr>
<td>110V</td>
<td>77.0 - 176.0V</td>
<td>12100 Ω</td>
<td>56.OA02.1124</td>
<td>56.OA02.1133</td>
<td>56.OA02.1142</td>
</tr>
</tbody>
</table>

### Ordering Information

- Contact Material, Example: AgSnO₂+.2µmAu
- AgNi10+.2µmAu
- AgNi10+5µmAu

### Footprints (solder side)

#### 2 NO/4 NC

![Footprint Image](image1.png)

#### 3 NO/3 NC

![Footprint Image](image2.png)

#### 4 NO/2 NC

![Footprint Image](image3.png)

### Dimensions

![Dimension Image](image4.png)

**Note:** All dimensions are shown in millimeters. To convert to inches, divide by 25.4.
Safety Relay
OA 5603

Features

- 8 output contacts
- International approvals: TÜV, UL, cUL
- Quality control check for each safety relay
- Forced-guided contacts, all gold flash plated
- Contact gap > 0.5 mm throughout life of relay
- Various contact materials, mixed contact material optional
- High coil voltage range
- High switching voltage
- High breakdown voltage: contact/coil ≥ 4 KV
- Contact/contact ≥ 4KV
- High creeping distance: contact/coil ≥ 8 mm
- Contact/contact ≥ 5.5 mm
- Crown contacts
- Solid connection between coil and contact housing
- Custom design available,
  - coil voltage
  - coil resistance,
  - contact pressure
  - operate/release time
  - IP67 washable

Technical Data

- **Nominal Coil Voltage**
  - 6, 12, 24, 48, 60, 110, DC

- **Coil Power Dissipation**
  - 1.25 - 1.65 W

- **Max. Switching Voltage**
  - 250V DC, 400V AC

- **Max. Switching Current**
  - 10 A

- **Max. Switching Power—DC**
  - 240W

- **Max. Switching Power—AC**
  - 2500 VA

- **Contact Switching Rate**
  - 10 operations per second

- **Relay Operate Time**
  - 27 ms

- **Relay Release Time**
  - 5 ms

- **Operation Vibration**
  - 0.35 mm Ampl. max @ 10...55Hz

- **Protection Rating**
  - IP 40

- **Contact Arrangements**
  - 2NO/6NC, 3NO/5NC, 4NO/4NC, 5NO/3NC, 6NO/2NC, 7NO/1NC

- **Contact Material**
  - AgSnO2+0.2µmAu, AgNi10+0.2µmAu, AgNi10+5µmAu

- **Mechanical Life**
  - 30x10⁶ Operation cycles

- **Electrical Life**
  - AgSnO2 >3x10⁵, AgNi10 >2x10⁵

- **Ambient Temperature**
  - -40...+75°C

- **Cover Material**
  - Thermoplastic

- **Weight**
  - 95 g

- More detailed data upon request

Diagrams

- Relay operation voltage vs. ambient temperature
- Limitation factor for inductive loads
- Maximum switching power curve
- Mechanical life
## Safety Relay OA 5603 Data

### Relay Data

<table>
<thead>
<tr>
<th>Rated Voltage</th>
<th>Voltage Range</th>
<th>Resistance (10%)</th>
<th>2 NO/6 NC Type</th>
<th>3 NO / 5 NC Type</th>
<th>4 NO / 4 NC Type</th>
<th>5 NO / 3 NC Type</th>
<th>6 NO / 2 NC Type</th>
<th>7 NO / 1 NC Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>6V</td>
<td>4.2 - 9.6V</td>
<td>21 Ω</td>
<td>56.OA03.0626</td>
<td>56.OA03.0635</td>
<td>29 Ω</td>
<td>56.OA03.0644</td>
<td>56.OA03.0653</td>
<td>56.OA03.0662</td>
</tr>
<tr>
<td>12V</td>
<td>8.4 - 19.2V</td>
<td>88 Ω</td>
<td>56.OA03.1226</td>
<td>56.OA03.1235</td>
<td>112 Ω</td>
<td>56.OA03.1244</td>
<td>56.OA03.1253</td>
<td>56.OA03.1262</td>
</tr>
<tr>
<td>24V</td>
<td>16.8 - 38.4V</td>
<td>370 Ω</td>
<td>56.OA03.2426</td>
<td>56.OA03.2435</td>
<td>460 Ω</td>
<td>56.OA03.2444</td>
<td>56.OA03.2453</td>
<td>56.OA03.2462</td>
</tr>
<tr>
<td>48V</td>
<td>33.6 - 76.8V</td>
<td>1400 Ω</td>
<td>56.OA03.4826</td>
<td>56.OA03.4835</td>
<td>1800 Ω</td>
<td>56.OA03.4844</td>
<td>56.OA03.4853</td>
<td>56.OA03.4862</td>
</tr>
<tr>
<td>60V</td>
<td>42.0 - 96.0V</td>
<td>2230 Ω</td>
<td>56.OA03.6026</td>
<td>56.OA03.6035</td>
<td>2880 Ω</td>
<td>56.OA03.6044</td>
<td>56.OA03.6053</td>
<td>56.OA03.6062</td>
</tr>
<tr>
<td>110V</td>
<td>77.0 - 176.0V</td>
<td>7150 Ω</td>
<td>56.OA03.1126</td>
<td>56.OA03.1135</td>
<td>9500 Ω</td>
<td>56.OA03.1144</td>
<td>56.OA03.1153</td>
<td>56.OA03.1162</td>
</tr>
</tbody>
</table>

### Ordering Information

Note: All dimensions are shown in millimeters. To convert to inches, divide by 25.4.

### Footprints (solder side)

- **7 NO/1 NC**
- **6 NO/2 NC**
- **5 NO/3 NC**
- **4 NO/4 NC**
- **3 NO/5 NC**
- **2 NO/6 NC**

**Contact Material, Example:**
- AgSnO₂⁺.2µmAu
- AgNi10+.2µmAu
- AgNi10+5µmAu

### Dimensions
SAFETY RELAY MODULES

8 Amp Contacts,
35 or 32mm DIN Rail

Altech Safety Relay Modules utilize Relays with Force-Guided-Contacts that meet or exceed international standards, TUV and UL. They are designed to protect man and machine as specified in OSHA FR1910 Regulations, a mandatory requirement of the European Machinery Directive EMD 89.392 EEC. The Safety Relays are used in Safety Devices such as Emergency Stop Modules, Safety Gate Monitors, 2-Hand Safety Modules, etc.

This series of Safety Relay Modules are Double Pole, Double Throw configurations, and are available as 1, 2, 4, 8 and 16 isolated channels and 8 and 16 bussed channels with 12 or 24 VDC coils. Isolated channels allow control of each relay by a different logic system, if necessary. There are two inputs for each relay coil per channel. Bussed channels allow high density packaging with a common input for all relays. Safety Relay Modules may be ordered with three different types of relay contact material, depending on the actual load current.

- Screw-Cage Clamp Connection
- LED Coil Voltage Indicator
- Reverse DC Polarity LED Protection
- Surge Suppression With DC Coils
- Industry Standard Relays
- DIN Rail Mount, Panel Mount Available

---

### Isolated Channels (No Bus) Length (L) mm (in.)

<table>
<thead>
<tr>
<th>Type/Cat. No.</th>
<th>Type/Cat. No.</th>
<th>Type/Cat. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Channel, Coil Voltage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12V</td>
<td>8949.2C</td>
<td>8951.2C</td>
</tr>
<tr>
<td>24V</td>
<td>8951.2C</td>
<td>8951.2C</td>
</tr>
<tr>
<td>2 Channel, Coil Voltage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12V</td>
<td>8949.3C</td>
<td>8951.3C</td>
</tr>
<tr>
<td>24V</td>
<td>8951.3C</td>
<td>8951.3C</td>
</tr>
<tr>
<td>4 Channel, Coil Voltage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12V</td>
<td>8955.2C</td>
<td>8956.2C</td>
</tr>
<tr>
<td>24V</td>
<td>8956.2C</td>
<td>8956.2C</td>
</tr>
<tr>
<td>8 Channel, Coil Voltage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12V</td>
<td>8955.3C</td>
<td>8956.3C</td>
</tr>
<tr>
<td>24V</td>
<td>8956.3C</td>
<td>8956.3C</td>
</tr>
<tr>
<td>16 Channel, Coil Voltage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12V</td>
<td>8963.2C</td>
<td>8972.2C</td>
</tr>
<tr>
<td>24V</td>
<td>8972.2C</td>
<td>8972.2C</td>
</tr>
</tbody>
</table>

### Bussed Channels Length (L) mm (in.)

<table>
<thead>
<tr>
<th>Type/Cat. No.</th>
<th>Type/Cat. No.</th>
<th>Type/Cat. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 Channel, Bussed DC+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12V</td>
<td>8923.2C</td>
<td>8924.2C</td>
</tr>
<tr>
<td>24V</td>
<td>8924.2C</td>
<td>8924.2C</td>
</tr>
<tr>
<td>8 Channel, Bussed DC-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12V</td>
<td>8923.3C</td>
<td>8924.3C</td>
</tr>
<tr>
<td>24V</td>
<td>8924.4C</td>
<td>8924.4C</td>
</tr>
<tr>
<td>16 Channel, Bussed DC+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12V</td>
<td>8926.2C</td>
<td>8926.3C</td>
</tr>
<tr>
<td>24V</td>
<td>8926.3C</td>
<td>8926.3C</td>
</tr>
<tr>
<td>16 Channel, Bussed DC-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12V</td>
<td>8927.2C</td>
<td>8927.3C</td>
</tr>
<tr>
<td>24V</td>
<td>8927.3C</td>
<td>8927.3C</td>
</tr>
</tbody>
</table>

---

Contact Material: AgSnO₂ + 0.2µmAu
Contact Ratings: 8A(2x5A) 250VDC, 400VAC

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Contact Material: AgNi10 + 0.2µmAu
Contact Ratings: 8A(2x5A) 250VDC, 400VAC

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Contact Material: AgNi10 + 5µmAu
Contact Ratings: 8A(2x5A) 250VDC, 400VAC

---

**Altech Corp.®**  •  35 Royal Road • Flemington NJ 08822-6000 • Phone (908) 806-9400 • FAX (908) 806-9490 • www.altechcorp.com
### Isolated Channel, DPDT

#### Relay Pinout

- **PIN Diameter:** 1.3mm +0.1, –0.0 (0.051 in. +0.004, –0.0)

- **Coil Circuits**

  - DC Coil Circuit
  - Bussed DC Negative or (Positive Switching)

- **Contact Circuits**

  - Top View of Module DPDT

### Bussed Channel, DPDT

#### Relay Pinout

- **PIN Diameter:** 1.3mm +0.1, –0.0 (0.051 in. +0.004, –0.0)

- **Coil Circuits**

  - DC Coil Circuit
  - Bussed DC Positive (Negative Switching)

  - Coil Circuit Repeats for Additional Relays

- **Contact Circuits**

  - DPDT Contact Circuit

### Relay Specifications

- **-Normal Coil Voltage:** 12.24 VDC
- **-Coil Power Dissipation:** 0.7W
- **-Max. Switching Voltage:** 250VDC, 400VAC
- **-Max. Switching Current:** 8A (2x5A simultaneous)
- **-Max. Switching Power:**
  - DC: 200W (2x160W simultaneous)
  - AC: 2000VA (2x1250VA simultaneous)
- **-Contact Switching Rate:** 10 operations/ sec.
- **-Relay Operate Time:** ≤ 15 ms
- **-Relay Release Time:** ≤ 12 ms
- **-Contact Arrangements:** DPDT, 2 FORM C
- **-Contact Material:**
  - Standard: AgNi10+0.2µmAu
  - Optional: AgSnO 2 +0.2µmAu
  - AgNi10+5µmAu
- **-Mechanical Life:** ≥ 50x10^6 operation cycles
- **-Ambient Temperature:** -40° to 70°C
- **-Cover Material:** Polyamide 6
- **-Weight:** 15g

### Coil Specifications

<table>
<thead>
<tr>
<th>Rated Voltage</th>
<th>Voltage Range</th>
<th>Coil Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>12VDC</td>
<td>9.6V-19.2V</td>
<td>210Ω ± 10%</td>
</tr>
<tr>
<td>24VDC</td>
<td>19.2V-38.4V</td>
<td>820Ω ± 10%</td>
</tr>
</tbody>
</table>

**Coil Circuits**

- For Both Isolated and Bussed Channels
SAFETY RELAY MODULES

SAFETY RELAY MODULES
4 Pole Relays, 8 or 10 Amps

Altech Safety Relay Modules utilize Relays with Force-Guided-Contacts that meet or exceed international standards, TÜV and UL. They are designed to protect man and machine as specified in OSHA CFR1910 Regulations, which is a mandatory requirement of the European Machinery Directive EMD 89.392 EEC.

Altech Safety Relays are electro-mechanical relays that are mechanically linked together, causing all contacts to move together when the coil is energized. Force-Guided-contacts are also known as positive-guided-contacts, captive contacts or locked contacts. In addition, our Safety Relays have Crown Contacts which provide two locations per contacts to improve switching conditions. The Safety Relays are used in Safety Devices such as Emergency Stop Modules, Safety Gate Monitors, 2-Hand Safety Modules, Safety Light Curtains, etc.

This series of Safety Relay Modules consist of 4 pole relays with two choices of configurations (2NO/2NC or 3NO/1NC), with 8 or 10 Amp contacts, and are available as 1, 2, and 4 isolated channels with 12, or 24 VDC coils. Isolated channels allows control of each relay by a different logic system, if necessary. There are two inputs for each relay coil per channel. Safety Relay Modules may be ordered with three different types of relay contact material, depending on the actual load current. The part numbers shown in this data sheet are for our standard contact material, which is AgSnO2 + 0.2µmAu.

- Screw-Cage clamp Connections
- LED Coil Voltage Indicator
- Reverse DC Polarity LED Protection
- Surge Suppression With DC Coil
- Din Rail Mount, Panel Mount Available

<table>
<thead>
<tr>
<th>Ordering Information</th>
<th>Length (L) mm (in.)</th>
<th>Type/ Cat. No.</th>
<th>Type/ Cat. No.</th>
<th>Type/ Cat. No.</th>
<th>Type/ Cat. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Channel, Coil Voltage</td>
<td>40.10 (1.58)</td>
<td>156.0A11.1222C</td>
<td>156.0A11.1231C</td>
<td>156.0A01.1222C</td>
<td>156.0A01.1231C</td>
</tr>
<tr>
<td>12V</td>
<td>24V</td>
<td>156.0A11.2422C</td>
<td>156.0A11.2431C</td>
<td>156.0A01.2422C</td>
<td>156.0A01.2431C</td>
</tr>
<tr>
<td>2 Channel, Coil Voltage</td>
<td>78.20 (3.08)</td>
<td>256.0A11.1222C</td>
<td>256.0A11.1231C</td>
<td>256.0A01.1222C</td>
<td>256.0A01.1231C</td>
</tr>
<tr>
<td>12V</td>
<td>24V</td>
<td>256.0A11.2422C</td>
<td>256.0A11.2431C</td>
<td>256.0A01.2422C</td>
<td>256.0A01.2431C</td>
</tr>
<tr>
<td>4 Channel, Coil Voltage</td>
<td>154.40 (6.08)</td>
<td>456.0A11.1222C</td>
<td>456.0A11.1231C</td>
<td>456.0A01.1222C</td>
<td>456.0A01.1231C</td>
</tr>
<tr>
<td>12V</td>
<td>24V</td>
<td>456.0A11.2422C</td>
<td>456.0A11.2431C</td>
<td>456.0A01.2422C</td>
<td>456.0A01.2431C</td>
</tr>
</tbody>
</table>

Contact Material*: AgSnO2 + 0.2µmAu
Contact Ratings: 8A(2x5A) 250VDC, 400VAC

* Note: Additional relay contact materials are available upon request. Please contact Altech for additional information.
4 Pole, 8 Amps

DC Coil Circuits

Contact Circuits

4 Pole, 10 Amps

DC Coil Circuits

Contact Circuits

Relay Specifications - 8 Amps

- Normal Coil Voltage: 12, 24 VDC
- Coil Power Dissipation: 0.6 W
- Max. Switching Voltage: 250 VDC, 400 VAC
- Max. Switching Current: 8 A
- Max. Switching Power:
  - DC: 200 W
  - AC: 2000 VA
- Contact Switching Rate:
- Relay Operate Time: ≤ 20 ms
- Relay Release Time: ≤ 6 ms
- Contact Arrangements: 2NO/2NC, 3NO/1NC
- Contact Material:
  - Standard: AgSnO₂ + 0.2 µm Au
  - Optional: AgNi₁₀ + 0.2 µm Au
  - AgNi₁₀ + 5 µm Au
- Mechanical Life: ≥ 50 x 10⁶ operation cycles
- Ambient Temperature: -40° to 85°C
- Cover Material: Thermoplas
- Weight: 35 g

Coil Specifications

<table>
<thead>
<tr>
<th>Rated Voltage</th>
<th>Voltage Range</th>
<th>Coil Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 VDC</td>
<td>8.4 V - 16.8 V</td>
<td>240 ± 10%</td>
</tr>
<tr>
<td>24 VDC</td>
<td>16.8 V - 33.6 V</td>
<td>960 ± 10%</td>
</tr>
</tbody>
</table>

Relay Specifications - 10 Amps

- Normal Coil Voltage: 12, 24 VDC
- Coil Power Dissipation: 0.75 W
- Max. Switching Voltage: 250 VDC, 400 VAC
- Max. Switching Current: 10 A
- Max. Switching Power:
  - DC: 240 W
  - AC: 2500 VA
- Contact Switching Rate:
- Relay Operate Time: ≤ 27 ms
- Relay Release Time: ≤ 5 ms
- Contact Arrangements: 2NO/2NC, 3NO/1NC
- Contact Material:
  - Standard: AgSnO₂ + 0.2 µm Au
  - Optional: AgNi₁₀ + 0.2 µm Au
  - AgNi₁₀ + 5 µm Au
- Mechanical Life: > 30 x 10⁶ operation cycles
- Ambient Temperature: -40° to 80°C
- Cover Material: Thermoplas
- Weight: 78 g

Coil Specifications

<table>
<thead>
<tr>
<th>Rated Voltage</th>
<th>Voltage Range</th>
<th>Coil Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 VDC</td>
<td>8.4 V - 19.2 V</td>
<td>1920 ± 10%</td>
</tr>
<tr>
<td>24 VDC</td>
<td>16.8 V - 38.4 V</td>
<td>770 ± 10%</td>
</tr>
</tbody>
</table>
SAFETY RELAY MODULES

6 Pole Relays, 8 or 10 Amps

Altech Safety Relay Modules utilize Relays with Force-Guided-Contacts that meet or exceed international standards, TÜV and UL. They are designed to protect man and machine as specified in OSHA CFR1910 Regulations, which is a mandatory requirement of the European Machinery Directive EMD 89/392 EEC.

Altech Safety Relays are electro-mechanical relays that are mechanically linked together, causing all contacts to move together when the coil is energized. Force-Guided-contacts are also known as positive-guided-contacts, captive contacts or locked contacts. In addition, our Safety Relays have Crown Contacts which provides two locations per contacts to improve switching conditions. The Safety Relays are used in Safety Devices such as Emergency Stop Modules, Safety Gate Monitors, 2-Hand Safety Modules, Safety Light Curtains, etc.

This series of Safety Relay Modules consist of 6 pole relays with three configuration choices (2NO+4NC, 3NO+3NC, 4NO+2NC), 8 or 10 Amp contacts and either 1, 2 and 4 isolated channels with 12 or 24 VDC coils. Isolated channels allow control of each relay by a different logic system, if necessary. There are two inputs for each relay coil channel. Modules can ordered with three contact materials, dependent upon the actual current load. The standard contact material is AgSnO₂ + 0.2μmAu.

- Screw-Cage clamp Connections
- LED Coil Voltage Indicator
- Reverse DC Polarity LED Protection
- Surge Suppression With DC Coil
- Din Rail Mount, Panel Mount Available

<table>
<thead>
<tr>
<th>Type/ Cat. No.</th>
<th>Type/ Cat. No.</th>
<th>Type/ Cat. No.</th>
<th>Type/ Cat. No.</th>
<th>Type/ Cat. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2N.0 + 4N.C</td>
<td>3N.0 + 3N.C</td>
<td>4N.0 + 2N.C</td>
<td>2N.0 + 4N.C</td>
<td>3N.0 + 3N.C</td>
</tr>
</tbody>
</table>

Contact Material*: AgSnO₂ + 0.2μmAu

Contact Ratings:
8A(2x5A) 250VDC, 400VAC
10A(2x5A) 250VDC, 400VAC

Ordering Information

<table>
<thead>
<tr>
<th>Channel</th>
<th>Coil Voltage</th>
<th>Length (L) mm (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12V</td>
<td>46.45 (1.83)</td>
</tr>
<tr>
<td></td>
<td>24V</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>12V</td>
<td>90.90 (3.58)</td>
</tr>
<tr>
<td></td>
<td>24V</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>12V</td>
<td>179.80 (7.08)</td>
</tr>
<tr>
<td></td>
<td>24V</td>
<td></td>
</tr>
</tbody>
</table>

* Note: Additional relay contact materials are available upon request. Please contact Altech for additional information.
6 Pole, 8 Amps

DC Coil Circuits

Contact Circuits

6 Pole, 10 Amps

DC Coil Circuits

Contact Circuits

Relay Specifications - 8 Amps

- Normal Coil Voltage: 12.24 VDC
- Coil Power Dissipation: 0.8-1.0 W
- Max. Switching Voltage: 250VDC, 400VAC
- Max. Switching Current: 8A
- Max. Switching Power
  DC: 200W (2x160W simultaneous)
  AC: 2000VA (2x1250VA simultaneous)
- Contact Switching Rate: 10 operations/sec
- Relay Operate Time ≤ 20 ms
- Relay Release Time ≤ 6 ms
- Contact Arrangements 2NO/4NC, 3NO/3NC, 4NO/2NC
- Contact Material:
  Standard AgSnO2 +0.2µmAu
  Optional AgNi10+0.2µmAu
  AgNi10+5µmAu
- Mechanical Life: ≥ 50x10^6 operation cycles
- Ambient Temperature: -40° + 85°C
- Cover Material: Thermoplast
- Weight: 38g

Coil Specifications

<table>
<thead>
<tr>
<th>Rated Voltage</th>
<th>Voltage Range</th>
<th>Coil Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>12VDC</td>
<td>8.4V-16.8V</td>
<td>145Ω ± 10%</td>
</tr>
<tr>
<td>24VDC</td>
<td>16.8V-33.6V</td>
<td>600Ω ± 10%</td>
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</table>

Relay Specifications - 10 Amps

- Normal Coil Voltage: 12.24 VDC
- Coil Power Dissipation: 1.0 W
- Max. Switching Voltage: 250VDC, 400VAC
- Max. Switching Current: 10A
- Max. Switching Power
  DC: 240W
  AC: 2500VA
- Contact Switching Rate: 10 operations/sec
- Relay Operate Time ≤ 27 ms
- Relay Release Time ≤ 5 ms
- Contact Arrangements 2NO/4NC, 3NO/3NC, 4NO/2NC
- Contact Material:
  Standard AgSnO2 +0.2µmAu
  Optional AgNi10+0.2µmAu
  AgNi10+5µmAu
- Mechanical Life: > 30x10^6 operation cycles
- Ambient Temperature: -40° + 80°C
- Cover Material: Thermoplast
- Weight: 85g

Coil Specifications

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<tr>
<th>Rated Voltage</th>
<th>Voltage Range</th>
<th>Coil Resistance</th>
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<td>145Ω ± 10%</td>
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<td>24VDC</td>
<td>16.8V-38.4V</td>
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## Accessories

**PCB Socket for OA/OW 5669***

**DIN Rail Socket for OA/OW 5669***

**Extraction Tool**

**Socket for OA 5601***

**Socket for OA 5602***

**Socket for OA 5603***

**Socket for OA 5611/12***

**Socket for OA 5621/22***

## Ordering Information

<table>
<thead>
<tr>
<th>Relay Style</th>
<th>Matching Socket</th>
<th>Socket Type</th>
<th>Extraction-Tool Type</th>
<th>Hold Down Clip Type</th>
<th>LED Module AC/DC, Green LED</th>
<th>Diode Module DC Red, LED</th>
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*Current data sheets of sockets are available on request.*
Applications

Safety relays with forced-guided contacts are the core components for safety devices and are indispensable when designing safety circuits. Safety devices are designed to protect man and machine as demanded in OSHA CFR 1910 Regulations “General Requirements for All Machinery”, and which is a mandatory requirement of the European Machinery Directive EMD 2006/42/EC.

DOLD safety relays, manufactured according to DIN EN 50205 and IEC/EN61810 are approved for use in safety applications to IEC 60204, EN 60204, DIN/VDE 0113, as well as Escalator Standard EN 115/06.95 and Elevator Standard EN 81-1 (electric) and EN81-2 (hydraulic), and in safety related parts of control systems in IEC/EN 62061 and EN ISO 13849.

Typical Applications
- Emergency stop modules
- DIN Rail safety modules
- Safety door controls
- Two-hand operating devices
- Pressure mat controls
- Light barriers and curtains
- Speed controls
- Monitoring devices

Equipment controls systems for:
- Elevators and escalators
- Cranes
- Door and gate drive systems
- Printing and textile machinery
- Robots
- Stamping machines
- Medical equipment
- Cutting machines
- Rail transportation systems
- Signaling systems
- Press systems

WARNING
Improper use and installation of safety relays - modules into safety related circuitry without complying with the applicable regulations can cause serious injury to the operator.

Due to the wide range of potential users and customers’ interpretation of the standards covering the applications of the safety relays described in this brochure, it is impossible for DOLD personnel or sales agents to be familiar with all safety and health standards and requirements that may apply to any specific application.

It is the responsibility of the user to determine the suitability of a safety relay for the intended application and to determine that the safety relay chosen and its installation will comply with all applicable safety and health regulations and codes.
Relay Terminology

Ambient Temperature: The temperature of the surrounding medium that comes in contact with the device/equipment.

Breakdown Voltage: The minimum root-mean-square (rms) value of a sinusoidal voltage that results in sparkover.

Coil, relay: One or more windings on a common form.

Coil Power Dissipation: The amount of electric power consumed by a winding. For the most practical purpose, this equals the $I^2R$ loss.

Coil Resistance: The total terminal-to-terminal resistance of a coil at a specified temperature.

Contact Gap: The final length of the isolating distance between mating contacts when the contacts are open.

Contact Arrangement: The combination of contact forms that make up the entire relay switching structure.

Contact Housing: The part that provides means for mounting fixed contacts on a supporting structure.

Contact Material: Substance or combination of substances used as constituents in the manufacture of the contacts.

$\text{AgSnO}_2 + 0.2\mu\text{mAu}$: Silver-Tin Dioxide with a $0.2\mu$ layer of gold. Medium to high current applications for resistive, capacitive and particular inductive loads, 100mA-10A.

$\text{AgNi10} + 0.2\mu\text{mAu}$: Silver-Nickel 10 with a $0.2\mu$ layer of gold. Medium to high current applications, 15mA-10A.

$\text{AgNi10} + 5\mu\text{mAu}$: Silver-Nickel 10 with a $5\mu$ layer of gold. Low current applications only, where switching of very low current is crucial; 1mA-300mA, 100mV-60V.

Contact Pressure: Force exerted by one contact against the mating contact of a relay.

Contact Switching Rate: The velocity at which contact switching occurs, e.g., 10 switching operations per second.

Corrosion: The deterioration of a substance, usually a metal, because of a reaction with its environment.

Cover Material: Substance or combination of substances used as constituents in the manufacture of a protective covering used to enclose equipment.

Creeping Distance: The shortest distance between two conducting parts measured along the surface or joints of the insulating material between them.

Safety Relay Selection Material Table

<table>
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<tr>
<th>Material</th>
<th>Characteristics</th>
<th>Applications</th>
<th>Range</th>
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</thead>
<tbody>
<tr>
<td>$\text{AgSnO}_2 + 0.2\mu\text{mAu}$ C</td>
<td>very low welding tendency highest burn-up resistivity very good arc suppression</td>
<td>special for switching, inductive loads</td>
<td>100mA - 10A</td>
</tr>
<tr>
<td>$\text{AgNi10} + 0.2\mu\text{mAu}$ N</td>
<td>low welding tendency high burn-up resistivity good arc suppression</td>
<td>circuits with medium to high switching current, DC current circuits</td>
<td>15mA - 10A</td>
</tr>
<tr>
<td>$\text{AgNi10} + 5\mu\text{mAu}$ S</td>
<td>higher welding tendency low burn-up resistivity low contact resistance</td>
<td>where very low to medium switching current and voltage is mandatory</td>
<td>1mA - 300mA</td>
</tr>
</tbody>
</table>

Crown Contacts: Improved contact form to enforce high contact stress on at least two spots on the contact to penetrate any built-up contamination; to maintain low contact resistance throughout the life of a relay; and to increase the value of switchable output voltage. Supports low current to high power applications.

Custom Design: Special design to meet customer requirements regarding coil voltage, coil resistance, contact pressure, and relay operate/release time. Possible alteration of max. 3 specifications from the original standard value while the remaining 1 is retained at its original value.

Forced-Guided Contacts: Electro-mechanical relay contacts that are mechanically linked together, so that when the relay coil is energized or de-energized, all of the linked contacts move together. If one set of contacts in the relay becomes immobilized, no other contact of the same relay will be able to move. An open-contact gap $> 0.5$ mm (0.02 in.) is maintained during life of the relay, even with malfunction, and at 1.6 x Nominal Voltage. Forced-Guided contacts are also known as captive contacts, positive-guided contacts, or locked contacts. They are used in Safety Relays.

Graphic Symbols

<table>
<thead>
<tr>
<th>Contact Name</th>
<th>Short Form</th>
<th>DIN / IEC Symbol</th>
<th>UL / CSA Symbol</th>
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<tr>
<td>Normally Open</td>
<td>NO, Form A</td>
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<td>Normally Closed</td>
<td>NC, Form B</td>
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<tr>
<td>Changeover</td>
<td>CO, Form C, SPDT</td>
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<td>[]</td>
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</table>
Relay Terminology

Forced-Guided versus Standard Relay Contacts

Forced-Guided Relay Contacts

- Normally Closed (Break) Contact is Open
- Normally Open (Make) Contacts are Closed

Standard Relay Contacts

- Normally Closed (Break) Contact is Open
- Normally Open (Make) Contacts are Closed

Relay is Energized
Relay is De-Energized
Contact is Welded Closed
Contact Remains Open
Contact Can Return To Closed State
**Relay Terminology**

**Flash-Plated:** Thin gold coating of the relay contacts to prevent corrosion during shelf-life (long-time storage).

**Mechanical Life:** Number of expected operation cycles of the relay contacts.

**Mixed Contact Material:** Pertaining to a safety relay on which each single contact can be made of different material, e.g., 6 pole safety relay: 4 n/o contacts made of AgSnO2 + 0.2µmAu and 2 n/c contacts made of AgNi 10 + 5µmAu.

**Normally Closed Contact (NC):** A relay contact pair that is closed when the coil is not energized.

**Normally Open Contact (NO):** A relay contact pair that is open when the coil is not energized.

**Nominal Coil Voltage:** The voltage by which the coil is designated and to which certain operating characteristics of the relay are related.

**Operating Voltage:** The voltage by which the relay performs to the desired function.

**Pin Diagram:** A diagram of the points at which a connection is made between the relay and the circuit board.

**Protection Rating:** Classification system for the sealing effectiveness of electrical equipment to protect against foreign bodies. In a two digit code, the first digit indicates the protection against solid objects, while the second indicates protection from moisture.

**International Protection (IP, according to IEC 529):** Protection against a process whereby unwanted material enter the relay to occupy space that would otherwise remain free of such material.

**IP 40, First digit 4:** Protection from entry by solid objects with a diameter greater than 1.0 mm.

**Second digit 0:** no special protection against moisture

**IP 67, First digit 6:** Dust-tight.

**Second digit 7:** Protection against immersion.

**Relay Operate Time:** The time interval from coil energization to the functioning time of the last contact to function.

**Relay Release Time:** The time interval from coil de-energization to the functioning time of the last contact to function.

**Safety Relay:** An electro-mechanical relay with forced-guided contacts used in Safety Devices such as Emergency Stop Modules, Safety Gate Monitors, 2-Hand Safety Modules, Safety Light Curtains, etc.

**Switching Current:** The value of the root-mean-square (rms) symmetrical current expressed in amperes, which the relay output contact interrupts at the rated maximum voltage and rated frequency.

**Switching Power:** The value of the product of switching voltage x switching current, which the relay output interrupts under certain test conditions.

**Switching Voltage:** The value of the voltage expressed in volt, which the relay output contact interrupts at the rated maximum current and rated frequency.

**Voltage Range:** The region between the lower and upper limits in regards of the Nominal Coil Voltage.

**Washable:** A sealed construction allows automatic washing and cleaning of the PC board.
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<th>Part Number</th>
<th>Page</th>
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