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## Main Contact Data

<table>
<thead>
<tr>
<th>Product Series</th>
<th>(MAP)航空航天Military</th>
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</thead>
<tbody>
<tr>
<td>MAP101 Aerospace Military</td>
<td>100</td>
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<tr>
<td>MAP100</td>
<td>12-900</td>
</tr>
<tr>
<td>MAP200</td>
<td>25,000</td>
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<tr>
<td>MAP201</td>
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## Overload (Make/Break) @ 350 Vdc

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<td>MAP201</td>
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## Contact Arrangement

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<tbody>
<tr>
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<td>MAP100</td>
<td>X(NO) or Latch</td>
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<tr>
<td>MAP200</td>
<td>Contact Resistance @ Rated Current mililohms 0.75</td>
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<tr>
<td>MAP201</td>
<td>Contact Form</td>
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## Auxiliary Contact Data

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<tr>
<td>MAP101 Aerospace Military</td>
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<td>MAP200</td>
<td>Minimum Signal Level Vdc/mdc</td>
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<td>MAP101 Aerospace Military</td>
<td>Contacts to Coil to All Other Points Vrms 1,500</td>
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</tr>
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<tr>
<td></td>
<td>Storage Temperature Range °C -65 to +125</td>
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<td>Shock, 11ms, 1/2 Sine G's 20</td>
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<td>Coil Transient Suppression No</td>
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<td>Mechanical Data</td>
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<td></td>
<td>Release Time, Max. ms 15</td>
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<td>Bounce Time, Max. ms 5</td>
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<td>Mechanical Life, Min. Cycles 100,000</td>
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<td></td>
<td>Weight (Nominal) lb. (kg) 0.79 (.35)</td>
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<td>Coil Voltage (Nominal) Vdc 28</td>
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Note: Consult Tyco Electronics for complete specifications, detailed performance characteristics and additional models.

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.

Dimensions are shown for reference purposes only. Specifications subject to change.
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<thead>
<tr>
<th>(CAP)</th>
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<th>(EV) OEM/Commercial &amp;Electric Vehicle</th>
<th>(LEV) Industrial Commercial</th>
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<td>CAP100</td>
<td>EV200A</td>
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<td>2000</td>
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<td>DPST</td>
<td>SPST</td>
<td>SPST</td>
<td>SPST</td>
</tr>
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<td>2X (NO)</td>
<td>X (NO)</td>
<td>X (NO)</td>
<td>X(NO)</td>
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<td>0.2</td>
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<td>Form C/4</td>
<td>Form A/2</td>
<td>Form C/1</td>
<td>Form A/1</td>
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<td>2.0/0.1</td>
<td>2.0/0.1</td>
<td>2.0/0.1</td>
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<tr>
<td>Ag 6V/15mA</td>
<td>Ag 6V/15mA</td>
<td>Ag 6V/15mA</td>
<td>Ag 6V/15mA</td>
</tr>
<tr>
<td>Au 5V/5mA</td>
<td>Au 5V/5mA</td>
<td>Au 5V/5mA</td>
<td>Au 5V/5mA</td>
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<td>100</td>
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</tr>
<tr>
<td>50</td>
<td>50</td>
<td>50</td>
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<td>-55 to +85</td>
<td>-55 to +85</td>
<td>-55 to +85</td>
<td>-40 to +85</td>
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<td>-65 to +125</td>
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<td>30</td>
<td>20</td>
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<td>20</td>
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</tr>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>40/20</td>
<td>40/20</td>
<td>25/15</td>
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<td>10</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>100,000</td>
<td>100,000</td>
<td>100,000</td>
<td>1,000,000</td>
</tr>
<tr>
<td>1.3 (.59)</td>
<td>0.95 (.43)</td>
<td>6.70 (190)</td>
<td>0.95 (.43)</td>
</tr>
<tr>
<td>28</td>
<td>28</td>
<td>28</td>
<td>9-36</td>
</tr>
</tbody>
</table>

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
KILOVAC MAP101 Series Contactor with 1 Form A (SPST-NO) Contacts Rated up to 100 Amps, 12-900 Vdc Dual Contact Material (Cu/Mo)

Physical Data

Contact Arrangement —
Main Contacts — SPST-Latching (form X)
1X Auxiliary Contact — SPST-NO (form A)
Dimensions — See drawing
Weight, Nominal — 0.35 Kg (12.35 oz)

Environmental Data

Shock, 11ms 1/2 Sine (Operating) — 20 G_{peak}
Sine Vibration, 20 G_{peak} — 55-2000 Hz
Random Vibration, 14.06 Grms — 15 Hz (0.02 G/Hz), 100 Hz (0.02 G/Hz), 450 Hz (1.2 G/Hz), 900 Hz (1.2 G/Hz), 2000 Hz (0.03 G/Hz)
Operating Temperature Range — -55°C to +85°C

Electrical Data

Voltage Rating —
Main Contacts (max) — 400 Vdc
Auxiliary Contacts — 30 Vdc
Current Rating, Continuous —
Main Contacts 1 — 100 A
Auxiliary Contacts — 3 A
Contact Resistance —
Main Contacts — 100 mΩ max @ 1 amp
0.75 mΩ max @ rated current
Auxiliary Contacts — 200 mΩ max
Electric Life at Rated Current 270 Vdc, Resistive Load — 25,000 cycles
Mechanical Life — 100,000 cycles
Dielectric Withstand Voltage —
Terminal to Terminal/ Terminals to Coil — 100MΩ min @ 500Vdc new
50MΩ min @ 500Vdc end of life

Insulation Resistance —
Terminal to Terminal/ Terminals to Coil —
100MΩ min @ 500Vrms new
50MΩ min @ 500Vrms end of life

Note:
1 Continuous current rating is affected by conductors attached. Keep terminals below 150°C max continuous.

Ordering Information

Typical Part Number —
MAP101 = 100 Amp, 12-900VDC Contactor
Dual Contact Material
Contact Form:
R - Latch with 1 SPST NO Aux.
Coil Voltage:
B = 28 Vdc Coil
Lead Length:
A = 15.3 in. (300 mm)
Coil Terminal Connector:
F = Plug on Flying Lead, 9 Pin Micro-D
Mounting & Power Terminals
E = side mount with 2x#8
10-32 Female Power Terminals

Product Facts

- Dual contact material (copper/moly) designed for high current make and interrupt military aerospace, ground vehicle and naval applications
- Hermetically sealed, intrinsically safe, operates in explosive/harsh environments with no oxidation or contamination of coils or contacts, during long periods of non-operation
- Comes standard with 1 SPST-NO Aux. contact
- Not position sensitive, can be mounted in any orientation

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
KILOVAC MAP101 Series Contactor (Continued)

Outline Dimensions

Connecter Pin-Out

<table>
<thead>
<tr>
<th>1</th>
<th>Not Connected</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Aux. NO</td>
</tr>
<tr>
<td>3</td>
<td>Close Return</td>
</tr>
<tr>
<td>4</td>
<td>Close Return</td>
</tr>
<tr>
<td>5</td>
<td>+28Vdc</td>
</tr>
<tr>
<td>6</td>
<td>Aux. Com.</td>
</tr>
<tr>
<td>7</td>
<td>Open Return</td>
</tr>
<tr>
<td>8</td>
<td>Open Return</td>
</tr>
<tr>
<td>9</td>
<td>+28V</td>
</tr>
</tbody>
</table>
**KILOVAC MAP100 Series Contactor with 1 Form A (SPST-NO)**

**Contacts Rated up to 100 Amps, 12-900 Vdc**

<table>
<thead>
<tr>
<th>Physical Data</th>
<th>Contact Arrangement — Main Contacts — SPST-Latching (or NO Form X) 1X Auxiliary Contact — SPST-NO (form A) Dimensions — See drawing Weight, Nominal — 0.35 Kg (12.35 oz)</th>
<th>Insulation Resistance — Terminal to Terminal/Terminals to Coil — 100MΩ min @ 500Vdc new 50MΩ min @ 500Vdc end of life Note: 1 Continuous current rating is affected by conductors attached. Keep terminals below 150°C max continuous.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Data</td>
<td>Shock, 11ms 1/2 Sine (Operating) — 20 G peak Sine Vibration, 20 G peak — 55-2000 Hz Random Vibration, 14.06 Grms — 15 Hz (0.02 G/Hz), 100 Hz (0.02 G/Hz), 450 Hz (12 G/Hz), 900 Hz (12 G/Hz), 2000 Hz (0.83 G/Hz) Operating Temperature Range — -55°C to +85°C</td>
<td>ordering Information</td>
</tr>
<tr>
<td>Electrical Data</td>
<td>Voltage Rating — Main Contacts (max) — 400 Vdc Auxiliary Contacts — 30 Vdc Current Rating, Continuous — Main Contacts 1 — 100 A Auxiliary Contacts — 3 A Contact Resistance — Main Contacts — 100 mΩ max @ 1 amp 0.75 mΩ max @ rated current Auxiliary Contacts — 200 mΩ max Electrical Life at Rated Current, 270 Vdc, Resistive Load — 15,000 cycles Mechanical Life — 100,000 cycles Dielectric Withstand Voltage — Terminal to Terminal/Terminals to Coil — 1mA max @ 1,300Vrms</td>
<td>Typical Part Number — MAP100 = 100 Amp, 12-900VDC Contactor Contact Form: — H = NO with 1 SPST NO Aux. R = Latch with 1 SPST NO Aux. Coil Voltage: — B = 28 Vdc Coil Lead Length: — A = 15.3 in. (300 mm) Coil Terminal Connector: — N = None F = Plug on Flying Lead, 9 Pin Micro-D Mounting &amp; Power Terminals — E = side mount with 2x#8 10-32 Female Power Terminals</td>
</tr>
</tbody>
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Outline Dimensions

Connector Pin-Out

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
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<td>1</td>
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<td>2</td>
<td>Aux. NO</td>
</tr>
<tr>
<td>3</td>
<td>Close Return</td>
</tr>
<tr>
<td>4</td>
<td>Close Return</td>
</tr>
<tr>
<td>5</td>
<td>+28Vdc</td>
</tr>
<tr>
<td>6</td>
<td>Aux. Com.</td>
</tr>
<tr>
<td>7</td>
<td>Open Return</td>
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<tr>
<td>8</td>
<td>Open Return</td>
</tr>
<tr>
<td>9</td>
<td>+28V</td>
</tr>
</tbody>
</table>
KILOVAC High Voltage DC Contactors

KILOVAC MAP200 Series Contactor with 1 Form A (SPST-NO) Contacts Rated up to 500 Amps, 12-900 Vdc

Product Facts
- Designed to be the smallest, lightest weight, lowest cost sealed contactor in the industry with its current rating for military aerospace, ground vehicle and naval, high current applications
- Built-in coil economizer (models requiring external economizer also available)
- Optional auxiliary contact for easy monitoring of power contact position
- Hermetically sealed — intrinsically safe, operates in explosive/harsh environments with no oxidation or contamination of coil or contacts, including long periods of non-operation
- Versatile coil and power connections

Performance Data
Contact Arrangement, Power Contacts — 1 Form A (SPST-NO)
Rated Operating Voltage — 12 - 900 VDC
Continuous (Carry) Current, Typical — 500 A @ 85°C, 400 mcm conductors
Consult Factory for required conductors for higher currents
Make/Break Current at Various Voltages 1 — See graph next page
Break Current at 320VDC 1 — 2,000 A, 1 cycle
Contact Resistance, Typ. (@200A) — 0.2 mohms
Load Life — See graph next page
Mechanical Life — 1 million cycles
Contact Arrangement, Auxiliary Contacts — 1 Form A (SPST-NO)
Aux. Contact Current, Max. — 2A @ 30VDC / 3A @ 125VAC
Aux. Contact Current, Min. — 100mA @ 8V
Aux. Contact Resistance, Max. — 0.417 ohms @ 30VDC / 0.150 ohms @ 125VAC
Dielectric Withstanding Voltage — 2,200 Vrms @ sea level
Insulation Resistance @ 500VDC — 100 megohms 2
Shock, 11ms 1/2 Sine, Peak, Operating — 20 G
Vibration, Sine, 50-2000Hz., Peak — 20 G
Operating Temperature — -55°C to +85°C
Weight, Nominal — .95 lb. (0.43 kg)

Notes:
1 Main power contacts
2 50 at end of life

Coil Operating Voltage (Valid Over Temperature Range)
Voltage (Will Operate) — 18-32VDC
Voltage (Max.) — 32VDC
Pickup (Close) Voltage Max. — 18VDC
Hold Voltage (Min.) — 10VDC
Dropout (Open) Voltage (Min.) — 2VDC
Inrush Current (Max.) — 4.5A
Holding Current (Avg.) — 0.5A
Inrush Time (Max.) — 100ms

Ordering Information
Typical Part Number ▶
Series:
MAP200 = 500 Amp, 12-900VDC Contactor
Contact Form:
A = Normally Open
H = Normally Open with Aux. Contacts
Coil Voltage:
R = 28 Vdc, Mechanical Economizer
S = 28 Vdc, Electrical Cut-throat Economizer
Coil Wire Length:
A = 15.3 in (390 mm)
D = Coil connector on relay (requires option “E” or “X” in next step).
Coil Terminal Connector:
N = No connector
E = 9-pin subminiature “D” plug mounted on contactor housing
X = Special configuration (consult factory)
Mounting & Power Terminals:
A = Bottom Mount & Male M8 x 1.25 Thread Terminals
B = Bottom Mount & Female 1/4-20 Thread Terminals
D = Bottom Mount & Female M6 x 1 Thread Terminals
KILOVAC MAP200 Series (Continued)

Outline Dimensions

- 3.289 ± .025 (83.54 ± .635)
- 2.688 ± .01 (68.28 ± .26)
- 1.05 ± .01 (26.67 ± .26)
- 1.05 ± .01 (26.67 ± .26)
- 2 X M6 x 1 THREAD
  .45 (11.43) MIN DEPTH (11 THREADS)
  TORQUE VS THREAD ENGAGEMENT
  8 TO 11 THREADS: 80 TO 100 IN-LB (9.1 TO 11.3 NM)
  7 TO 8 THREADS: 70 TO 80 IN-LB (7.9 TO 9.1 NM)
  5 TO 7 THREADS: 60 TO 70 IN-LB (6.8 TO 7.9)
- 2 X 10-32 THREAD THRU
  TORQUE: 15 TO 30 IN-LB (1.7 TO 3.3 NM)
- 2.245 ± .025 (57.02 ± .635)
- 1.431 ± .025 (36.35 ± .635)
- .546 ± .01 (13.87 ± .26)
- 3.17 ± .01 (80.48 ± .26)
- 2.523 ± .025 (64.08 ± .635)
- 2.20 ± .025 (55.81 ± .63)
- WIRE VIEW REMOVED FOR CLARITY

Estimated Make & Break Power Switching Ratings

- Estimated Make & Break Power Switching Region
- Break Only Above 650A

**NOTES:**
1) For resistive loads with 300H maximum inductance. Consult factory for inductive loads.
2) Estimates based on extrapolated data. User is encouraged to confirm performance in application.
3) End of life when dielectric strength between terminals falls below 50 megohms @ 500VDC.
4) The maximum make current is 650A to avoid contact welding.

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
# KILOVAC MAP201 Series Contactor with 2 Form A (SPST-NO)

## Contacts Rated up to 350 Amps, 12-900 Vdc Dual Contact Material (Cu/Mo)

### Product Facts
- Designed to be the smallest, lightest weight, lowest cost sealed contactor in the industry with its current rating for military aerospace
- Built-in coil economizer (models requiring external economizer also available)
- Optional auxiliary contact for easy monitoring of power contact position
- Hermetically sealed — intrinsically safe, operates in explosive/harsh environments with no oxidation or contamination of coil or contacts, including long periods of non-operation
- Versatile coil and power connections

### Physical Data

**Contact Arrangement**
- Power Contacts — SPST-NO (form X)
- 2X Auxiliary Contacts 1 — SPST-NO (form A)

**Dimensions** — See drawing

**Weight, Nominal** — 0.45 Kg (0.99 lb)

### Environmental Data

**Shock, 11ms 1/2 Sine (Operating)** — 20 G peak

**Sine Vibration, 20 G peak** — 55-2000 Hz

**Random Vibration, 14.06 G rms** — 15 Hz (0.02 G/Hz), 100 Hz (0.02 G/Hz), 450 Hz (12 G/Hz), 900 Hz (12 G/Hz), 2000 Hz (0.083 G/Hz)

**Operating Temperature Range** — -55°C to +85°C

### Electrical Data

**Voltage Rating**
- Main Contacts (max) — 400 Vdc
- Auxiliary Contacts — 30 Vdc

**Current Rating, Continuous**
- Main Contacts 1 — 300 A
- Auxiliary Contacts — 3 A

**Contact Resistance**
- Main Contacts 1 — 100 mΩ max @ 1 amp
- 0.3 mΩ max @ rated current
- Auxiliary Contacts — 200 mΩ max

**Hot Switching Performance (Polarity Sensitive)**
- 600A make/260A break @ ±270Vdc — 11,000 cycles
- 550A make/break @ ±360Vdc — 100 cycles
- 2000A capacitive make — 100 cycles
- 2000A make/break @ ±360Vdc — 5 cycles
- 1000A make/break @ ±360Vdc — 2 cycles

**Mechanical Life** — 100,000 cycles

**Dielectric Withstand Voltage**
- Terminal to Terminal/Terminals to Coil — 100 mΩ min @ 500Vdc

**Insulation Resistance**
- Terminal to Terminal/Terminals to Coil — 100 MΩ min @ 500Vdc

### Notes:
1. Two form A available with electronic coil economizer, 1 form A available with mechanical coil economizer
2. Continuous current rating is affected by conductors attached.
3. Initial contact resistance may be higher than 0.3 mΩ, but will drop below within 30 minutes maximum

### Coil Data

**Coil Voltage, Nominal/Max** — 28/32 Vdc

**Pick Up (Max)** — 16 Vdc

**Inrush Current @ 28Vdc (Max)** — 3.5 A

**Inrush Time (Max)** — 100 ms

**Hold Current (Max)** — 0.32 A

**Drop Out** — 4 to 10 Vdc

**Main Contacts**
- Operate Time (Max) — 18 ms
- Operate Bounce (Max) — 5 ms
- Release Time — 18 ms

**Auxiliary Contacts Operate/Release** — Within ± 5 ms of main

### Ordering Information

**Typical Part Number**

<table>
<thead>
<tr>
<th>Series:</th>
<th>MAP201 = 350 Amp, 12-900VDC Contactor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Form:</td>
<td>A = Normally Open</td>
</tr>
<tr>
<td></td>
<td>H = Normally Open with Aux. Contacts</td>
</tr>
<tr>
<td>Coil Voltage:</td>
<td>R = 28 Vdc, Mechanical Economizer</td>
</tr>
<tr>
<td></td>
<td>S = 28 Vdc, Electrical Cut-throat Economizer</td>
</tr>
<tr>
<td>Coil Wire Length:</td>
<td>A = 15.3 in (390 mm)</td>
</tr>
<tr>
<td></td>
<td>D = Coil connector on relay (requires option “E” or “X” in next step)</td>
</tr>
<tr>
<td>Coil Terminal Connector:</td>
<td>N = No connector</td>
</tr>
<tr>
<td></td>
<td>E = 9-pin subminiature “D” plug mounted on contactor housing</td>
</tr>
<tr>
<td></td>
<td>X = Special configuration (consult factory)</td>
</tr>
</tbody>
</table>

**Mounting & Power Terminals**
- A = Bottom Mount & Male M8 x 1.25 Thread Terminals
- B = Bottom Mount & Female 1/4-20 Thread Terminals
- D = Bottom Mount & Female M6 x 1 Thread Terminals

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
Outline Dimensions*

Flying Lead “D” Connector Pin-Out

| 1  | N/C  |
| 2  | AUX1 COM |
| 3  | AUX2 COM |
| 4  | RTN1 |
| 5  | +28Vdc |
| 6  | N/C  |
| 7  | AUX3 NO |
| 8  | AUX2 NO |
| 9  | RTN2 |

MAP200HR D-Sub Pin Out
Coil+ = Pin 2
Coil - = Pin 6
Aux. COM = Pin 8
Aux. NO = Pin 4

MAP200AR
Coil+ = Pin 2
Coil - = Pin 6

*Alternate coil and main terminal connections available, consult factory.
KILOVAC High Voltage DC Contactors

KILOVAC CAP202 Series Aerospace Commercial Contactor with 2 Form X (DPST-NO), Contacts Rated up to 300 Amps, 12-600 Vdc

Product Facts
- Designed to be the smallest, lightest weight, lowest cost High Voltage DC contactor with its power ratings
- Not sensitive to power connection polarity
- Built-in electronic coil economizer (other types possible for special applications)
- Up to 4 optional auxiliary contacts, each with three optional configurations: SPTST-NO, SFST-NC and SPDT
- Hermetically sealed-intrinsically sale, operates in explosive/harsh environments with no oxidation or contamination of coil or contacts, including long periods of non-operation
- Versatile coil and power connections

Performance Data
- Contact Arrangement, Power Contacts — DPST-NO Form X
- Mechanical Life — 100,000 cycles
- Voltage Rating
  - Main Contacts (max) — 600 Vdc
  - Auxiliary Contacts — 30 Vdc
- Current Rating, Continuous
  - Main Contacts — 300 A
  - Auxiliary Contacts — 3 A
- Contact Resistance
  - Main Contacts — 200 mΩ max
  - Auxiliary Contacts — 3 A
- Hot Switching Performance (Bi-Polarity)
  - 100A make break @ ± 270Vdc — 50,000 cycles
  - 250A make/break @ ± 270Vdc — 1000 cycles
  - 690A make/break @ ± 360Vdc — 10 cycles
- Mechanical Life — 100,000 cycles
- Dielectric Withstand Voltage
  - Terminal to Terminal/Terminalsto Coil — 1mA max @ 2,200Vrms
- Insulation Resistance
  - Terminal to Terminal/Terminalsto Coil — 100MΩ min @ 500Vdc
- Shock, 11ms 1/2 Sine, Peak, Operating — 20 G
- Vibration, Sine, 55-2000Hz., Peak — 20 G
- Operating Temperature — -55°C to +85°C
- Weight, Nominal — 1.59 lb. (72 kg)

Notes:
1. Continuous current rating is affected by conductors attached. Keep terminals below 150°C continuous, 175°C for 1 hour max. and 200°C for 1 min. max.
2. Initial contact resistance may be higher than 0.3 mΩ, but will drop below within 30 minutes max.

Ordering Information

Typical Part Number ►

Series: CAP202 = 500 Amp, 12-900VDC Contactor
Contact Form:
A = Normally Open
M = Normally Open with Aux. Contacts Config
Coil Voltage:
S = 28 Vdc Coil with Mechanical Dual Coil Economizer
Coil Wire Length:
A = 15.3 in (390 mm)
B = 6.0 in (152 mm)
Coil Terminal Connector:
N = None
E = 9-pin subminiature "D" plug mounted on contactor housing
F = 9-pin subminiature "D" plug mounted on 15.3 in (390 mm) flying leads.
X = Special configuration (consult factory)
Mounting & Power Terminals:
A = Bottom Mount & Female
M = 1.0 2X M5

Coil Operating Voltage
- Voltage/Nominal Max. — 28-32VDC
- Pickup Voltage Max. — 18VDC
- Inrush Current (Max.) @ 28 Vdc — 4.0A
- Inrush Time (Max.) — 4.35A
- Hold Current (Max.) — 4.35A
- Drop Out — 2 to 8 Vdc
- Main Contacts: Operate Time (max.) — 25 mS
- Main Contacts: Operate Bounce (max.) — 10 mS
- Main Contacts: Release time — 15 mS
- Auxiliary Contacts Operate/Release — Within ± 5 mS

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
Outline Dimensions*

2X M5 Mounting Holes

4X M6 X 1.0 FEMALE THREAD POWER TERMINALS

9 PIN MALE D PLUG

5.25 ± .25
(not to scale)

2.32
.50
3.79

2.74
3.31
1.16
1.00

KILOVAC CAP202 Series Aerospace Commercial Contactor (Continued)
KILOVAC CAP200 Series Contactor with 1 Form A (SPST-NO) Contacts Rated up to 500 Amps, 12-900 Vdc

Product Facts

- Designed to be the smallest, lightest weight, lowest cost sealed contactor in the industry with its current rating
- Built-in coil economizer — only 1.7W hold power @ 12VDC and it limits back EMF to 0V. (models requiring external economizer also available)
- Optional auxiliary contact for easy monitoring of power contact position
- Hermetically sealed — intrinsically safe, operates in explosive/harsh environments with no oxidation or contamination of coil or contacts, including long periods of non-operation
- Versatile coil and power connections

Performance Data

Contact Arrangement, Power Contacts — 1 Form A (SPST-NO)
Rated Operating Voltage — 12 - 900 VDC
Continuous (Carry) Current, Typical — 500 A @ 85°C, 400 mcm conductors
Consult Factory for required conductors for higher currents
Make/Break Current at Various Voltages 1 — See graph next page
Break Current at 320VDC 1 — 2,000 A, 1 cycle 3
Contact Resistance, Typ. (@200A) — 0.2 mohms
Load Life — See graph next page
Mechanical Life — 1 million cycles
Contact Arrangement, Auxiliary Contacts — 1 Form A (SPST-NO)
Aux. Contact Current, Max. — 2A @ 30VDC / 3A @ 125VAC
Aux. Contact Current, Min. — 100mA @ 8V
Aux. Contact Resistance, Max. — 0.417 ohms @ 30VDC / 0.150 ohms @ 125VAC
Dielectric Withstanding Voltage — 2,200 Vrms @ sea level
Insulation Resistance @ 500VDC — 100 megohms 2
Shock, 11ms 1/2 Sine, Peak, Operating — 20 G
Vibration, Sine, 80-2000Hz., Peak — 20 G
Operating Temperature — -40°C to +85°C
Weight, Nominal — .95 lb. (.43 kg)

Notes:
1 Main power contacts
2 50 at end of life
3 Does not meet dielectric & IR after test, 1700 amp for unit with Aux. Contacts

Coil Operating Voltage (Valid Over Temperature Range)

<table>
<thead>
<tr>
<th>Voltage (Will Operate)</th>
<th>9-36VDC</th>
<th>32-95VDC</th>
<th>48-95VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage (Max.)</td>
<td>36VDC</td>
<td>95VDC</td>
<td>95VDC</td>
</tr>
<tr>
<td>Pickup (Close) Voltage Max.</td>
<td>9VDC</td>
<td>32VDC</td>
<td>48VDC</td>
</tr>
<tr>
<td>Hold Voltage (Min.)</td>
<td>7.5VDC</td>
<td>22VDC</td>
<td>34VDC</td>
</tr>
<tr>
<td>Dropout (Open) Voltage (Min.)</td>
<td>6VDC</td>
<td>18VDC</td>
<td>27VDC</td>
</tr>
<tr>
<td>Inrush Current (Max.)</td>
<td>3.8A</td>
<td>1.3A</td>
<td>0.7A</td>
</tr>
<tr>
<td>Holding Current (Avg.)</td>
<td>0.13A@12V</td>
<td>0.07A@24V</td>
<td>0.03A@48V</td>
</tr>
<tr>
<td>Inrush Time (Max.)</td>
<td>130ms</td>
<td>130ms</td>
<td>130ms</td>
</tr>
</tbody>
</table>

Ordering Information

Typical Part Number CAP200 A A A A

Series: CAP200 = 500 Amp, 12-900VDC Contactor
Contact Form:
A = Normally Open
H = Normally Open with Aux. Contacts

Coil Voltage:
A = 9-36VDC (1 = requires external coil economizer)
D = 32-95VDC (2 = requires external coil economizer)
J = 48-95VDC (3 = requires external coil economizer)
R = 28 Vdc with mechanical economizer

Coil Wire Length:
A = 15.3 in (390 mm)
D = Coil connector on relay (requires option "E" or "F" in next step)

Coil Terminal Connector:
N = None
E = 9-pin subminiature “D” plug mounted on contactor housing
F = 9-pin subminiature “D” plug mounted on 15.3 in (390 mm) flying leads.
X = Special configuration (consult factory)

Mounting & Power Terminals:
A = Bottom Mount & Male 10mm x 8 Terminals

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
**KILOVAC CAP200 Series** (Continued)

**Outline Dimensions**

<table>
<thead>
<tr>
<th>Component</th>
<th>Dimension (inches)</th>
<th>Dimension (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1 + POSITIVE TERMINAL</td>
<td>2.29 ± .02 DIA</td>
<td>58.19 ± .51</td>
</tr>
<tr>
<td>A2 – NEGATIVE TERMINAL</td>
<td>.255 ± .01 DIA</td>
<td>6.52 ± .26</td>
</tr>
<tr>
<td>WHITE + AUXILIARY CONTACT</td>
<td>1.05 ± .01</td>
<td>26.67 ± .26</td>
</tr>
<tr>
<td>BLACK – COIL</td>
<td>2.04 ± .02 DIA</td>
<td>51.94 ± .51</td>
</tr>
<tr>
<td>RED + COIL</td>
<td>2.17 ± .01</td>
<td>54.08 ± .26</td>
</tr>
<tr>
<td>M8 x 1.25 POWER TERMINALS (HARDWARE SUPPLIED):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 X M8 WASHER, STAINLESS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 X M8 LOCK WASHER – SPLIT RING, STAINLESS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 X M8 x 1.25 NUT, STAINLESS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TORQUE 80 TO 100 IN-LB (8.8 TO 11 NM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MOUNTING HARDWARE (NOT SUPPLIED):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 X M5 BOLT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 X M5 LOCK WASHER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 X M5 NARROW WASHER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TORQUE 15 TO 30 IN-LB (1.7 TO 3.3 NM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AUXILIARY CONTACT LEADS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDL LEADS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAINLESS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WHITE + AUXILIARY CONTACT (WHEN ORDERED):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BLACK – COIL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RED + COIL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEE CDL WIRE LENGTH IN P/N</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Estimated Make & Break Power Switching Ratings**

<table>
<thead>
<tr>
<th>Load Current (A)</th>
<th>1,000</th>
<th>10,000</th>
<th>100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>650A Break Only Above 650A</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:**
1) For resistive loads with 300H maximum inductance. Consult factory for inductive loads.
2) Estimates based on extrapolated data. User is encouraged to confirm performance in application.
3) End of life when dielectric strength between terminals falls below 50 megohms @ 500VDC.
4) The maximum make current is 650A to avoid contact welding.

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
KILOVAC High Voltage DC Contactors

KILOVAC CAP100 Series 900 Vdc Contactor

Product Facts
- Commercial aerospace product
- Hermetically sealed — intrinsically safe. Operates in explosive/harsh environments without oxidation or contamination of contacts, during long periods of non-operation
- 8kV isolation between open contacts permits use for high voltage isolation and carry, optional auxiliary contacts
- 12, 24 and 48 Vdc coils
- Solid copper contacts
- Designed and built in accordance to AIAG QS9000

Description
Lowest cost, 900 Vdc 100 amp, hermetically sealed DC contactor in the industry with coil suppression and 1 Form C Aux. contact
Compact package available in side- or bottom-mount reinforced configurations, not position sensitive

Applications
Power/motor control circuit isolation, circuit protection and power distribution
Commercial Aerospace
Mechanical
Compact epoxy-sealed resin enclosure occupies only about 4 in³ (65.5 cm³)
Robust integral mounting plate on either bottom or side of enclosure accepts two M4 screws
Inert gas filled contact chamber
Flying leads for coil connections
Load terminals threaded for M5 bolts (not included)

Performance Data
Physical Data
Contact Arrangement, Main Contacts — SPST-NO-DM (1 Form X)
Dimensions — See drawings on next page
Weight — 6.7 oz (190g)

Contact Data
Contact Arrangement, Main Contacts — SPST-NO-DM (1 Form X)
Voltage Rating, Main Contacts Switching (Max) — 900VDC
Current Rating, Main Contacts Switching — Continuous 1 — 100A
Short Term, 3 Minutes 2 — 200A
Hot Switching Performance (Polarity Sensitive) —
50A make/break @ +400Vdc — 50,000 cycles
100A make/break @ +400Vdc — 6,000 cycles
100A make/break @ -400Vdc — 1,000 cycles
200A make/break @ +400Vdc — 500 cycles
1,000A make/break only @ +400Vdc — 10 cycles
600A make only — 25 cycles
Maximum Short Circuit Current (1/2 cycle, 60 Hz) — 1,250A
(through closed contacts)

Dielectric Withstand Voltage 3 —
Between Open Contacts — 5,600Vrms/8,000Vdc
Contacts to Coil — 2,000Vrms/4,000Vdc

Insulation Resistance, Terminal to Terminal / Terminals to Coil —
When New — 100 megohms, min. @ 500Vdc
At End of Life — 50 megohms, min. @ 500Vdc

Mechanical Life — 1 million cycles
Operate & Release Time
Operate Time Max. — 25ms
Operate Bounce Max. — 5ms
Release Time — 10ms

Environmental Data
Shock, 11ms 1/2 sine (operating) — 20G peak
Sine Vibration, 20G peak — 55-2,000 Hz.
Operating Temperature Range — -55°C to +85°C
Noise Emission (at 100 mm distance) — 70dB(a)

Notes
1 8.4mm² conductor. Current rating depends upon conductor size. Keep terminals below 175°C max continuous.
2 3 minutes at +40°C ambient with 8.4 mm² (#8 AWG) conductor.
3 2,000Vrms minimum under all conditions, until end of life.
KILOVAC CAP100 Series (Continued)

<table>
<thead>
<tr>
<th>Specification</th>
<th>12Vdc</th>
<th>24Vdc</th>
<th>48Vdc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Voltage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pick Up Voltage (20°C)</td>
<td>8Vdc</td>
<td>16Vdc</td>
<td>33Vdc</td>
</tr>
<tr>
<td>Drop Out Voltage (20°C)</td>
<td>1.2Vdc</td>
<td>2.4Vdc</td>
<td>4.8Vdc</td>
</tr>
<tr>
<td>Coil Current (Nominal at 20°C, 12vdc)</td>
<td>461mA</td>
<td>250mA</td>
<td>122mA</td>
</tr>
<tr>
<td>Coil Power Nominal @ Vnom, +20°C</td>
<td>5.5W</td>
<td>6.0W</td>
<td>6.0W</td>
</tr>
<tr>
<td>Pickup (Close) Voltage Max. @ 85°C</td>
<td>9.6Vdc</td>
<td>19.2Vdc</td>
<td>38.4Vdc</td>
</tr>
<tr>
<td>Coil Resistance Nominal @ +20°C ± 5% (ohms)</td>
<td>26</td>
<td>96</td>
<td>392</td>
</tr>
</tbody>
</table>

1 Do not exceed 8.0W coil power for extended periods

---

Life Cycles vs Resistive Load up to 900Vdc

Ordering Information

Typical Part Number: CAP100 A 4 A N G

Series:
CAP100 = 100A Contactor

Contact Arrangement:
A = 1 Form X (SPST-NO-DM)
K = NO with 1 SPDT Aux.

Coil Voltage:
4 = 12VDC
5 = 24VDC
6 = 48VDC

Coil Wire Length:
A = 15 inches [.4M]

Coil Termination:
N = None – Stripped Wires
(Consult factory for connector options)

Mounting and Power Terminals:
G = Bottom Mount (2 x #8); M5 x 10
H = Side Mount (2 x #8); M5 x 10

---

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
KILOVAC CAP100 Series (Continued)

**Bottom Mount**

- Mounting Hardware (not supplied): 2 x M4 bolt, lockwasher and washer
  - Torque: 20 in-lbs max [2.3 Nm max]

- M5 Female Load Terminals - 2 Places
  - Hardware (not supplied): 2 x M5 bolt, lockwasher and washer
  - Torque: 30 to 40 in-lbs [3.4 to 4.5 Nm]

**Side Mount**

- Mounting Hardware (not supplied): 2 x M4 bolt, lockwasher and washer
  - Torque: 20 in-lbs max [2.3 Nm max]

- M5 Female Load Terminals - 2 Places
  - Hardware (not supplied): 2 x M5 bolt, lockwasher and washer
  - Torque: 30 to 40 in-lbs [3.4 to 4.5 Nm]

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
KILOVAC EV200 Series Contactor With 1 Form X (SPST-NO) Contacts Rated 500+ Amps, 12-900 Vdc

Product Facts

- Designed to be the smallest, lightest weight, lowest cost sealed contactor in the industry with its current rating (500+A carry, 2000A interrupt at 320VDC)
- Built-in coil economizer — only 1.7W hold power @ 12VDC and it limits back EMF to 0V. Models requiring external economizer also available
- Optional auxiliary contact for easy monitoring of power contact position
- Hermetically sealed — intrinsically safe, operates in explosive/harsh environments with no oxidation or contamination of coil or contacts, during long periods of non-operation
- Versatile coil/power connections
- UL Recognized for the U.S. and Canada (File E208033) All contact ratings & coil versions may not be UL Recognized
- CE marked for EC applications
- AIAG QS9000 designed, built and approved

Performance Data

Contact Arrangement, Power Contacts — 1 Form A (SPST-NO)
Rated Operating Voltage — 12 - 900 VDC
Continuous (Carry) Current, Typical — 500 A @ 85°C, 400 mcm conductors
Consult Factory for required conductors for higher (500+ A) currents
Make/Break Current at Various Voltages 1 — See graph next page
Break Current at 320VDC 1 — 2,000 A, 1 cycle 3
Contact Resistance, Typ. (@200A) — 0.2 mohms
Load Life — See graph next page
Mechanical Life — 1 million cycles
Contact Arrangement, Auxiliary Contacts — 1 Form A (SPST-NO)
Aux. Contact Current, Max. — 2A @ 30VDC / 3A @ 125VAC
Aux. Contact Current, Min. — 100mA @ 8V
Aux. Contact Resistance, Max. — 0.417 ohms @ 30VDC / .150 ohms @ 125VAC
Operate Time @ 25°C — Close (includes bounce), Typ. — 15 ms
Vibration, Sine, 80-2000Hz., Peak — 20 G
Operating Ambient Temperature — -40°C to +85°C
Weight, Nominal — .95 lb. (.43 kg)

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.

Notes:
1 Main power contacts
2 50 at end of life
3 Does not meet dielectric & IR after test, 1700 amp for unit with Aux. Contacts

Typical Part Number

<table>
<thead>
<tr>
<th>Series</th>
<th>EV200 500+ Amp, 12-900VDC Contactor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Form</td>
<td>A = Normally Open</td>
</tr>
<tr>
<td></td>
<td>H = Normally Open with NO Aux. Contacts</td>
</tr>
<tr>
<td></td>
<td>G = Normally Open with NC Aux. Contacts</td>
</tr>
<tr>
<td>Coil Voltage</td>
<td>A = 9-36VDC (1 = requires external coil economizer)</td>
</tr>
<tr>
<td></td>
<td>D = 32-95VDC (2 = requires external coil economizer)</td>
</tr>
<tr>
<td></td>
<td>J = 48-95VDC (3 = requires external coil economizer)</td>
</tr>
<tr>
<td></td>
<td>R = 28VDC with Mechanical Economizer</td>
</tr>
<tr>
<td>Coil Wire Length</td>
<td>A = 15.3 in (390 mm)</td>
</tr>
<tr>
<td>Coil Terminal Connector</td>
<td>N = None</td>
</tr>
<tr>
<td></td>
<td>C = Molex Mini-fit Jr, 2 Skt, Female 18-24, P/N 39-01-2020 &amp; 39-00-0060 +red is pin 1 (A length only)</td>
</tr>
<tr>
<td>Mounting &amp; Power Terminals</td>
<td>A = Bottom Mount &amp; Male 10mm x M8 Terminals</td>
</tr>
</tbody>
</table>

Ordering Information
Estimated Make & Break Power Switching Ratings

**Continuous Current Carry Region**

- 100,000
- 10,000
- 1,000
- 100
- 10
- 1

**200A Non-continuous Current Carry Region**

- 100,000
- 10,000
- 1,000
- 100
- 10
- 1

**Estimated Life (Cycles)**

- Load Current (A)
  - 700
  - 650
  - 600
  - 550
  - 500
  - 450
  - 400
  - 350
  - 300
  - 250
  - 200
  - 150
  - 100
  - 50
  - 0

- Time (ms)
  - 2.0
  - 1.5
  - 1.0
  - 0.5
  - 0.0

**EV200 Capacitive Make Test Curves for Pre-Charged Motor Controller**

- 80% Minimum Pre Charge
- 90% Nominal Pre Charge

**NOTES:**
1) For resistive loads with 300 mH maximum inductance
2) Estimates based on extrapolated data. User is encouraged to verify rating in actual application.
3) End of life when dielectric strength between terminals falls below 50 megohms @ 500VDC.
4) The maximum contact make and break power is estimated at 208KW. Break only above 208KW to avoid contact welding.
Product Facts
- Normally closed version of popular EV200 series contactors
- Designed to be the smallest, lowest cost, lightest weight sealed contactor in the industry at its current rating
- Optional auxiliary contacts for monitoring position of power contacts
- Hermetically sealed — operates in explosive/harsh environments with no oxidation or contamination of coil or contacts during long periods of non-operation
- Not position sensitive, can be mounted in any orientation

Physical Data
Contact Arrangements — Main Contacts — SPST, Normally Closed
Dimensions — See drawing
Weight, Nominal — .95 lb. (.43 kg)

Environmental Data
Shock, 11ms 1/2 Sine (Operating) — 30 Gpeak (Closed)
10 Gpeak (Open)
Sine Vibration, 10 Gpeak — 55-2000 Hz
Random Vibration, 7.1 Gms — 15 Hz (.001 G/Hz), 100 Hz (.04 G/Hz), 1000 Hz (.04 G/Hz), 1500 Hz (.02 G/Hz)
Operating Temperature Range — -40°C to +85°C

Electrical Data
Voltage Rating — Main Contacts (Max) — 750 Vdc
Current Rating, Continuous — Main Contacts 1 — 500A
Contact Resistance — Main Contacts 2 — 0.2 mΩ max above 300A
3.0 mΩ max between 50 and 300A
Hot Switching Performance (Positive Polarity) 3 —
200A make/break @ 270Vdc — 10,000 cycles
600A make/break @ 360Vdc — 100 cycles
800A break only @ 360Vdc — 15 cycles
1500A break only @ 360Vdc — 1 cycle
Mechanical Life (Min) — 100,000 cycles
Dielectric Withstand Voltage — Terminal to Terminal/ Terminals to Coil — 100MΩ min @ 500Vdc new
50MΩ min @ 500Vdc end of life

Coil Data 4
Nominal Coil Voltage 5 —
Low range — 9.6-14 Vdc
High range — 19-28 Vdc
Pick Up (Max) @ 25°C — 9.6/18.5 Vdc
Pick Up @ Max Coil Temperature — 10.5/22 Vdc
Hold (Min) — 6/12 Vdc

Ordering Information
Typical Part Number
Series:
EV200 = 500+ Amp, 12-900Vdc Contactor
Contact Form:
B = Normally Closed
D = Normally Closed, 1 SPDT Aux.
Coil Voltage (with Economizer):
A = 12/24 Vdc
Coil Terminals:
A = 15.3 in. (300 mm)
Coil Terminal Connector:
N = None
Mounting & Power Terminations:
A = Bottom Mount & Male 10 Max. M8 Threaded Terminals

Notes:
1 Ambient conditions and conductor design affect rating. Terminal temperature rise should be 75°C max above ambient. Keep relay terminals below 150°C max continuous, 175°C max for two hours, and 200°C for 1 minute.
2 Stabilized reading. Contact resistance may exceed spec in the first 10 minutes of current carry.
3 Units are polarity sensitive. Approximately 50% de-rating for reverse polarity switching. Consult factory for review of specific requirements.
4 Over temperature range unless noted.
5 Voltage ranged sensed by contactor 10 ms after application of source voltage.
6 Pickup duration 100 ms.

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
KILOVAC EV200B Series Contactor (Continued)

Outline Dimensions

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.
Dimensions are shown for reference purposes only. Specifications subject to change.
**Product Facts**
- Latching version of popular EV200 Series
- Designed to be the smallest, lowest cost, lightest weight sealed contactor in the industry at its current rating
- Optional auxiliary contacts for monitoring position of power contacts
- Hermetically sealed — operates in explosive/harsh environments with no oxidation or contamination of coil or contacts during long periods of non-operation
- Not position sensitive, can be mounted in any orientation

**Physical Data**
- **Contact Arrangements**
  - Main Contacts — SPST, Latching
  - Auxiliary Contacts 1 — Up to 2 Form A
- **Dimensions** — See drawing
- **Weight, Nominal** — .95 lb. (.43 kg)

**Environmental Data**
- **Shock, 11ms 1/2 Sine**
  - Operating: 30 G peak
- **Sine Vibration, 20 G peak**
  - 55-2000 Hz
- **Random Vibration, 14.06 Grms**
  - 15 Hz (.002 G/Hz), 100 Hz (.002 G/Hz), 450 Hz (.12 G/Hz), 900 Hz (.12 G/Hz), 2000 Hz (.083 G/Hz)
- **Operating Temperature Range**
  - -40°C to +85°C

**Electrical Data**
- **Voltage Rating**
  - Main Contacts (Max) — 750 Vdc
- **Current Rating, Continuous**
  - Main Contacts 2 — 500A
- **Contact Resistance**
  - Main Contacts 3
    - 0.2 mΩ max above 300A
    - 0.3 mΩ max between 50 and 300A
- **Hot Switching Performance (Positive Polarity)**
  - 200A make/ break @ 270Vdc — 10,000 cycles
  - 600A make/ break @ 360Vdc — 100 cycles
  - 800A break only @ 360Vdc — 15 cycles
  - 2000A break only @ 360Vdc — 1 cycle
- **Mechanical Life (Min)** — 100,000 cycles

**Dielectric Withstand Voltage**
- Terminal to Terminal/ Terminals to Coil — 1mA max @ 2,200 Vrms
- Terminal to Terminal/ Terminals to Coil — 100MΩ min @ 500Vdc new
  - 50MΩ min @ 500Vdc end of life

**Ordering Information**
- **Series:**
  - EV200 = 500+ Amp, 12-900Vdc Contactor
- **Contact Form:**
  - P = Latching
  - F = Latching with 1 SPDT Aux.
- **Coil Voltage:**
  - 4 = 12 Vdc
  - 5 = 24 Vdc
  - 6 = 48 Vdc
- **Coil Terminations:**
  - A = 15.3 in. (300 mm)
- **Coil Terminator Connector:**
  - N = None
- **Mounting & Power Terminals:**
  - A = Bottom Mount & Male 10mm x M8 Threaded Terminals

**Notes:**
1. Product can be configured alternately with form B or C auxiliary switches if required. This changes the product part number, depending on specific auxiliary configuration. Consult Tyco Electronics for availability and part number
2. Ambient conditions and conductor design affect rating. Terminal temperature rise should be 75°C max above ambient. Keep relay terminals below 150°C max continuous, 175°C max for two hours, and 200°C for 1 minute.
3. Approximately 50% de-rating for reverse polarity switching.
4. Over temperature range unless noted. Suggested coil pulse = 50-100 ms.
5. 24V and 48V coils available on request — consult factory.
6. Intermittent Duty Coil. Coil overheating can occur if duty cycle is exceeded. Limit average coil power to 10W maximum.
Dimensions are shown for reference purposes only. Specifications subject to change.

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
KILOVAC High Voltage DC Contactors

KILOVAC EV100 Series Contactor With 1 Form X
Contacts Rated 100 Amps Continuous, 900 Vdc

Product Facts

- 8kV isolation between open contacts permits use for high voltage isolation and carry
- Designed and built in accordance to AIAG QS9000
- 9-36 economized coil
- Hermetically sealed — operates in explosive/harsh environments with no oxidation or contamination of coil or contacts during long periods of non-operation
- Not position sensitive, can be mounted in any orientation

Physical Data

Contact Arrangements —
Main Contacts — SPST-NO-DM (1 Form X)
Dimensions — See drawing
Weight, Nominal — 4 oz (126g)

Environmental Data

Shock, 11ms 1/2 Sine (Operating) — 20 Gpeak
Sine Vibration, 20 Gpeak — 55-2000 Hz
Noise Emission (at 100 mm distance) — 70dB(a)
Operating Temperature Range — -40°C to +85°C

Electrical Data

Voltage Rating —
Main Contacts (Max) — 900 Vdc
Current Rating, Continuous —
Main Contacts — 100A
Short Term · 3 mins. — 200A

Hot Switching Performance (Positive Polarity) 3 —
50A make/break @ +400Vdc — 50,000 cycles
100A make/break @ +400Vdc — 6,000 cycles
100A make/break @ -400Vdc — 1,000 cycles
200A make/break @ +400 Vdc — 500 cycles
1,000A make only @ +400 Vdc — 10 cycles
600A make only @ — 25 cycles
Mechanical Life (Min) — 1 million cycles
Dielectric Withstand Voltage —
Between Open Contacts — 5,600 Vrms/8,000 VDC
Contacts to Coil — 2,000 Vrms/4,000 Vdc
Insulation Resistance —
Terminal to Terminal/Terminals to Coil — 100MΩ min @ 500Vdc new
50MΩ min @ 500Vdc end of life

Coil Data

In Rush Max Current — 3.5 A
High range — 36 Vdc
Avg. Hold Current —
100mA @ 12V, 45 mA @ 24V

Ordering Information

Typical Part Number

Series:
EV100 = 100A Contactor
Contact Form:
A = 1 Form X (SPST-NO-DM)
Coil Voltage (with Economizer):
A = 9-36 Vdc Electrical Economizer
4 = No Economizer(1)
Coil Terminals:
A = 15 in. (.4 m)
Coil Terminal Connector:
N = None - Stripped Wires
Mounting & Power Terminations:
A = Bottom Mount (2 x #8); M5 x10

(1) Requires external economizer.

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
Outline Dimensions

Bottom Mount

KILOVAC EV100 Series (Continued)

MOUNTING HARDWARE (NOT SUPPLIED):
2 X M4 BOLT, LOCKWASHER AND WASHER
TORQUE: 20 IN-LBS MAX [2.3 NM MAX]

M5 FEMALE LOAD TERMINALS - 2 PLACES
HARDWARE (NOT SUPPLIED)
2 X M5 BOLT, LOCKWASHER AND WASHER
TORQUE: 30 TO 40 IN-LBS [3.4 TO 4.5 NM]
KILOVAC High Voltage DC Contactors

KILOVAC LEV100 Series 900 Vdc Contactor
With 1 Form X Contacts Rated 100A Continuous

Product Facts
- Hermetically sealed — intrinsically safe. Operates in explosive/harsh environments without oxidation or contamination of contacts, including long periods of non-operation
- 8kV isolation between open contacts permits use for high voltage isolation and carry
- 12, 24 and 48 Vdc coils
- Designed and built in accordance to AIAG QS9000
- Not position sensitive, can be mounted in any orientation
- Solid copper contacts

Description
Lowest cost, 900 Vdc 100 amp, hermetically sealed DC contactor in the industry
Compact package available in side- or bottom-mount configurations, not position sensitive

Applications
Power/motor control circuit isolation, circuit protection and safety in industrial machinery
Automotive battery switching and backup

Mechanical
Compact epoxy-sealed resin enclosure occupies only about 4 in³ (65.5 cm³)
Robust integral mounting plate on either bottom or side of enclosure accepts two M4 screws
Inert gas filled contact chamber
Flying leads for coil connections
Load terminals threaded for M5 bolts (not included)

Performance Data
Physical Data
Contact Arrangement, Main Contacts — SPST-NO-DM (1 Form X)
Dimensions — See drawings on next page
Weight — 6.7 oz (190g)

Contact Data
Contact Arrangement, Main Contacts — SPST-NO-DM (1 Form X)
Voltage Rating, Main Contacts Switching (Max) — 900VDC
Current Rating, Main Contacts Switching — Continuous 1 — 100A
Short Term, 3 Minutes 2 — 200A
Hot Switching Performance (Polarity Sensitive)
- 50A make/break @ +400Vdc — 50,000 cycles
- 100A make/break @ +400Vdc — 6,000 cycles
- 100A make/break @ -400Vdc — 1,000 cycles
- 200A make/break @ +400Vdc — 500 cycles
- 1,000A break only @ +400Vdc — 25 cycles
- 600A make only — 25 cycles

Maximum Short Circuit Current (1/2 cycle, 60 Hz) — 1,250A

Dielectric Withstand Voltage
- Between Open Contacts — 5,600Vrms/8,000Vdc
- Contacts to Coil — 2,000Vrms/4,000Vdc

Insulation Resistance, Terminal to Terminal / Terminals to Coil —
When New — 100 megohms, min. @ 500Vdc
At End of Life — 50 megohms, min. @ 500Vdc

Operate & Release Time
Operate Time Max. — 25ms
Operate Bounce Max. — 5ms
Release Time — 10ms

Environmental Data
Shock, 11ms 1/2 sine (operating) — 20G peak
Sine Vibration, 20G peak — 55-2,000 Hz.
Operating Temperature Range — -40°C to +85°C
Noise Emission (at 100 mm distance) — 70dB(a)

Notes
1 8.4 mm² conductor. Current rating depends upon conductor size.
2 Keep terminals below 175°C max continuous.
3 3 minutes at +40°C ambient with 8.4 mm² (#8 AWG) conductor.
4 2,000Vrms minimum under all conditions, until end of life.
KILOVAC LEV100 Series 900 Vdc Contactor (Continued)

<table>
<thead>
<tr>
<th>Specifications</th>
<th>LEV100 A4 AN G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series:</td>
<td>LEV100 = 100A Contactor</td>
</tr>
<tr>
<td>Contact Arrangement:</td>
<td>A = 1 Form X (SPST-NO-DM)</td>
</tr>
<tr>
<td>Coil Voltage:</td>
<td>4 = 12VDC</td>
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<tr>
<td></td>
<td>5 = 24VDC</td>
</tr>
<tr>
<td></td>
<td>6 = 48VDC</td>
</tr>
<tr>
<td>Coil Wire Length:</td>
<td>A = 15 inches [.4M]</td>
</tr>
<tr>
<td>Coil Termination:</td>
<td>N = None – Stripped Wires</td>
</tr>
<tr>
<td>Mounting and Power Terminals:</td>
<td>G = Bottom Mount (2 x #8); M5 x 10</td>
</tr>
<tr>
<td></td>
<td>H = Side Mount (2 x #8); M5 x 10</td>
</tr>
</tbody>
</table>

Life Cycles vs Resistive Load up to 900Vdc

Ordering Information
KILOVAC LEV100 Series 900 Vdc Contactor  (Continued)

**Bottom Mount**

**Product Offering**

<table>
<thead>
<tr>
<th>Bottom Mount Models</th>
<th>LEV100A4ANG</th>
<th>12Vdc coil</th>
<th>15” [.4m] leads</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-161839-7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9-161839-8</td>
<td>LEV100A5ANG</td>
<td>24Vdc coil</td>
<td>15” [.4m] leads</td>
</tr>
<tr>
<td>3-161839-1-7</td>
<td>LEV100A6ANG</td>
<td>48Vdc coil</td>
<td>15” [.4m] leads</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Side Mount Models</th>
<th>LEV100A4ANH</th>
<th>12Vdc coil</th>
<th>15” [.4m] leads</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-161839-0</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4-161839-1-1</td>
<td>LEV100A5ANH</td>
<td>24Vdc coil</td>
<td>15” [.4m] leads</td>
</tr>
<tr>
<td>4-161839-1-2</td>
<td>LEV100A6ANH</td>
<td>48Vdc coil</td>
<td>15” [.4m] leads</td>
</tr>
</tbody>
</table>

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
KILOVAC LEV200 Series Contactor With 1 Form X Contacts Rated 500+ Amps, 12-900Vdc

Performance Data
Contact Arrangement, Power Contacts — 1 Form X (SPST-NO-DM)
Rated Operating Voltage — 12 - 900 VDC
Continuous (Carry) Current, Typical — 500 A @ 65°C, 400 mcm conductors
Consult Tyco Electronics for required conductors for higher (500+ A) currents
Make/Break Current at Various Voltages 1 — See graph next page
Break Current at 320VDC 1 — 2,000 A, 1 cycle 3
Contact Resistance, Typ. (@200A) — 0.2 mohms
Load Life — See graph next page
Mechanical Life — 100,000 cycles
Contact Arrangement, Auxiliary Contacts — 1 Form A (SPST-NO)
Aux. Contact Current, Max. — 2A @ 30VDC / 3A @ 125VAC
Aux. Contact Current, Min. — 100mA @ 8V
Aux. Contact Resistance, Max. — 0.147 ohms @ 30VDC / 0.150 ohms @ 125VAC
Operate Time @ 25°C
Close (includes bounce), Typ. — 25 ms
Bounce (after close only), Max. — 7 ms
Release (includes arcing), Max @ 2000A — 12 ms
Dielectric Withstanding Voltage — 2,200Vrms @ sea level (leakage <1mA)
Insulation Resistance @ 500VDC — 100 megohms 2
Shock, 11ms 1/2 Sine, Peak, Operating — 20 G
Vibration, Sine, 80-2000Hz., Peak — 20 G
Operating Ambient Temperature — -40°C to +85°C
Weight, Typical — 1.3 lb. (.60 kg)

Notes:
1 Main power contacts
2 50 at end of life
3 Does not meet dielectric & IR after test, 1700 amp for unit with Aux. Contacts
4 Contacts will operate with 0.8Vnom < Vcoil < 1.1Vnom over temperature range.

Invalid Combinations/Reason
LEV200H-NA_ — No auxiliary function with coil studs
LEV200_O-NA_ — No coil studs with rectifier circuit
LEV200_9NA_ — No coil studs with rectifier circuit
LEV200_O_F — No side mount with rectifier circuit
LEV200_9_F — No side mount with rectifier circuit
KILOVAC High Voltage DC Contactors

KILOVAC LEV200 Series (Continued)

Outline Dimensions

Side Mount Enclosure

Bottom Mount Enclosure

Estimated Make & Break Power Switching Ratings

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.

Electrical Load Life Ratings for Typical LEV Applications

Make/Break Life Capacitive & Resistive Loads at 320VDC (1) (2)

Mechanical Life

Cycles

650A Break Only Above 650A

NOTE:

1) For resistive loads with 300H maximum inductance. Consult factory for inductive loads.
2) Estimates based on extrapolated data. User is encouraged to confirm performance in application.
3) End of life when dielectric strength between terminals falls below 50 megohms @ 500VDC.
4) The maximum make current is 650A to avoid contact welding.

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.

Specifications subject to change.

Catalog 5-1773450-5
Revised 9-08
www.tycoelectronics.com

USA: 1-800-522-6752
Canada: 1-905-470-4425
Mexico: 01-800-733-8926
C. America: 52-55-1106-0803
South America: 55-11-2103-6000
Hong Kong: 852-2735-1628
Japan: 81-44-844-8013
UK: 44-870-880-208

Dimensions are shown for reference purposes only.
FM200 ("Flatman III") Series Contactor
200 Amps, 480 VAC (50/60 Hz), or 48 Vdc, 1-, 2-, or 3-poles

Product Facts
- Multi-pole configurations
- Normally open, normally closed and mixed contact arrangements
- Optional quick connect tabs for sensing
- Small, lightweight & cost-effective – designed to be the smallest, lowest cost contactor in the industry with its current rating
- Standard models available with 12VDC, 24VDC and 115 VAC coils. Consult factory for 240VAC coil models.
- 1 Form A auxiliary contacts

Product Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
<th>Value for FM200 Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Arrangement</td>
<td></td>
<td>1, 2 or 3 poles</td>
</tr>
<tr>
<td>Contact Form (per pole)</td>
<td></td>
<td>Form X or Y (NO-DM or NC-DB)</td>
</tr>
<tr>
<td>Rated Operating Voltage</td>
<td>V</td>
<td>480Vrms (L-L) or 48VDC</td>
</tr>
<tr>
<td>Max. Contact Voltage (transient)</td>
<td>V</td>
<td>750Vrms or 60VDC</td>
</tr>
<tr>
<td>Continuous (Carry) Current</td>
<td>Arms or ADC</td>
<td>200/pole (Form X) 150/pole (Form Y)</td>
</tr>
<tr>
<td>Power Switching Form X (0.7-1.0 PF)</td>
<td>Cycles</td>
<td>2,000 @ 300Amps 10,000@ 200Amps 20,000 @ 100Amps 5,000 @ 200A/48VDC 2 million @ 50A/28VDC</td>
</tr>
<tr>
<td>Power Switching Form Y (0.7-1.0 PF)</td>
<td>Cycles</td>
<td>2,000 @ 225Amps 10,000@ 150Amps 20,000 @ 75Amps 5,000 @ 150A/48VDC 2 million @ 50A/28VDC</td>
</tr>
<tr>
<td>Mechanical Life</td>
<td>Cycles</td>
<td>&gt;2 million</td>
</tr>
<tr>
<td>Auxiliary Contact Voltage Drop</td>
<td>mV</td>
<td>75 for Form X or Form Y</td>
</tr>
<tr>
<td>Auxiliary Contact Rating</td>
<td>Arms or ADC</td>
<td>1 Form A (SPST-NC)</td>
</tr>
<tr>
<td>Dielectric Withstanding Voltage</td>
<td>Vrms</td>
<td>2,200 @ sea level</td>
</tr>
<tr>
<td>Insulation Resistance</td>
<td>Megohms</td>
<td>100</td>
</tr>
<tr>
<td>Shock, 11ms 1/2 sine, peak</td>
<td>G</td>
<td>10</td>
</tr>
<tr>
<td>Vibration, sine, 10-2000Hz.</td>
<td>G</td>
<td>5</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>°C</td>
<td>-20 to +60</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>°C</td>
<td>-40 to +45</td>
</tr>
<tr>
<td>Ambient Humidity</td>
<td>%RH</td>
<td>0 to 95</td>
</tr>
<tr>
<td>Weight</td>
<td>oz / kg</td>
<td>17.6 - 49.4 / 0.5 -1.4</td>
</tr>
</tbody>
</table>

Available Pole Configurations and Applicable Coil Codes

<table>
<thead>
<tr>
<th>No. of NC Poles (across)</th>
<th>No. of NO Poles (down)</th>
<th>D</th>
<th>Y</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

| X = Form X (NO-DM) | Y = Form Y (NC-DB) |

<table>
<thead>
<tr>
<th>Coil Operating Voltage (valid over temperature range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coil Designator</td>
</tr>
<tr>
<td>Nominal Voltage</td>
</tr>
<tr>
<td>Voltage Range</td>
</tr>
<tr>
<td>Hold Voltage</td>
</tr>
<tr>
<td>Dropout Voltage</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coil Resistance Data for Pole Configurations (@25°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coil Designator</td>
</tr>
<tr>
<td>Resistance ±10%</td>
</tr>
<tr>
<td>Current/Power</td>
</tr>
<tr>
<td>Power Switching Form X (0.7-1.0 PF)</td>
</tr>
<tr>
<td>Power Switching Form Y (0.7-1.0 PF)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coil Current/Power Data for Pole Configurations (@25°C, V coil=1.1V nom)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coil Designator</td>
</tr>
<tr>
<td>Current/Power</td>
</tr>
<tr>
<td>Power Switching Form X (0.7-1.0 PF)</td>
</tr>
<tr>
<td>Power Switching Form Y (0.7-1.0 PF)</td>
</tr>
</tbody>
</table>

| Coil Designator | C | D*** | Pick-Up I / Duration |
|-----------------------------------------------------|
| Current/Power | Arms or ADC | 1 @ 30VDC, 3 @ 125VAC |
| Power Switching Form X (0.7-1.0 PF) | Cycles | 2,000 @ 300Amps 10,000@ 200Amps 20,000 @ 100Amps 5,000 @ 200A/48VDC 2 million @ 50A/28VDC |
| Power Switching Form Y (0.7-1.0 PF) | Cycles | 2,000 @ 225Amps 10,000@ 150Amps 20,000 @ 75Amps 5,000 @ 150A/48VDC 2 million @ 50A/28VDC |

**Average coil current. ***Economized. **Economized.

Operate/Release Time (25°C, 0.8V nom ≤ V ≤ V nom ) Typ.

| Coil Designator | Units | A | B*** | C**** | D**** |
|-----------------------------------------------------|
| Operate Time | ms | 25-50 | 50-150 | 20-30 |
| Release Time | ms | 10-20 | 70-80 | 75-100 | 75-100 |
| Bounce Time | ms | 2-5 | 2-5 | 2-5 | 2-5 |

**Includes internal coil suppression.
FM200 “Flatman III” Series Contactor (Continued)

Part Numbering System

Typical Part Number

<table>
<thead>
<tr>
<th>Series</th>
<th>FM200</th>
<th>A</th>
<th>B</th>
<th>XYY</th>
</tr>
</thead>
<tbody>
<tr>
<td>FM200</td>
<td>Multipole, 200 Amp, 480VAC/48VDC Contactor</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Control Voltage:

- A = 12VDC Coil, No Suppression
- B = 24VDC Converter, with Suppression
- C = 115VAC Converter, with Suppression
- D = 24VDC Electronic Chopper, with Suppression
- E = 240VAC Converter, with Suppression - Consult Factory for Availability and Specifications

Optional Termination:

- A = Optional Quick Connect Tabs
- B = No Optional Terminals

Pole Configuration (All models have a 1 Form A (SPST-NO) auxiliary switch):

- X = 1 Form X (SPST-NO-DM), Available with control voltage codes A, B, C and E
- XX = 2 Form X (2PST-NO-DM), Available with control voltage codes A, B, C and E
- XXX = 3 Form X (3PST-NO-DM), Available with control voltage codes A, B, C and E
- Y = 1 Form Y (SPST-NC-DB), Available only with control voltage code D
- YY = 2 Form Y (DPST-NC-DB), Available only with control voltage code D
- YYYY = 1 Form X (SPST-NO-DM) + 1 Form Y (SPST-NC-DB), Available with control voltage codes A, B, C and E
- XY = 1 Form X (SPST-NO-DM) + 1 Form Y (SPST-NC-DB), Available only with control voltage code D
- XYY = 1 Form X (SPST-NO-DM) + 1 Form Y (SPST-NC-DB), Available only with control voltage code D
- YYYY = 3 Form Y (3PST-NC-DB), Available only with control voltage code D

Outline Dimensions

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.

Dimensions are shown for reference purposes only. Specifications subject to change.

USA: 1-800-522-6752
Canada: 1-905-470-4425
Mexico: 01-800-733-8926
C. America: 52-55-1106-0803
UK: 44-8706-080-208

Catalog 5-1773450-5
Revised 9-08

www.tycoelectronics.com
AC30 Series Contactor, 60 Amps, 600 VAC (50/60 Hz), 3 Form A (3PST-NO)

Product Facts
- Designed to be the smallest, lowest cost contactor in the industry with its current rating
- Built-in coil economizer – only 1.7W hold power @ 12VDC and limits back EMF to zero volts
- Hermetically sealed – intrinsically safe, operates in explosive & harsh environments with no oxidation or contamination of coils or contacts, including long periods of non-operation.

Submitted for UL and CE evaluation

Performance Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
<th>Value for AC30 Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Arrangement</td>
<td>3 poles</td>
<td></td>
</tr>
<tr>
<td>Contact Form (per pole)</td>
<td>Form A (NO)</td>
<td></td>
</tr>
<tr>
<td>Rated Operating Voltage</td>
<td>V</td>
<td>600Vrms (L-L)</td>
</tr>
<tr>
<td>Max. Contact Voltage (transient)</td>
<td>V</td>
<td>600Vrms (L-N)</td>
</tr>
<tr>
<td>Continuous (Carry) Current</td>
<td>Arms</td>
<td>60/pole</td>
</tr>
<tr>
<td>Power Switching (0.7-1.0 PF)</td>
<td>Cycles</td>
<td>50 @ 60Arms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>500 @ 10Arms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>500 @ 30Arms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10,000 @ 10Arms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50,000 @ 5Arms</td>
</tr>
<tr>
<td>Mechanical Life</td>
<td>Cycles</td>
<td>1 million</td>
</tr>
<tr>
<td>Contact Voltage Drop (Max., Per Pole)</td>
<td>mV</td>
<td>120 @ 60Arms</td>
</tr>
<tr>
<td>Dielectric Withstanding Voltage</td>
<td>Vrms</td>
<td>2,200 @ sea level</td>
</tr>
<tr>
<td>Insulation Resistance @ 500VDC</td>
<td>Megohms</td>
<td>100</td>
</tr>
<tr>
<td>Shock, 11ms 1/2 sine, peak, operating</td>
<td>G</td>
<td>20</td>
</tr>
<tr>
<td>Vibration, sine, 80-2000Hz.</td>
<td>G</td>
<td>20</td>
</tr>
<tr>
<td>Operating Temperature °C</td>
<td>-40 to +85</td>
<td></td>
</tr>
<tr>
<td>Storage Temperature °C</td>
<td>-55 to +125</td>
<td></td>
</tr>
<tr>
<td>Ambient Humidity %RH</td>
<td>0 to 95</td>
<td></td>
</tr>
<tr>
<td>Weight lb. (kg)</td>
<td>.83 (.38)</td>
<td></td>
</tr>
</tbody>
</table>

Operate/Release Time (25°C)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operate Time (Includes bounce)</td>
<td>16 nominal / 35 maximum</td>
</tr>
<tr>
<td>Bounce Time (After Operate)</td>
<td>4 nominal / 11 maximum</td>
</tr>
<tr>
<td>Release Time (includes arcing)</td>
<td>5 nominal / 8 maximum</td>
</tr>
</tbody>
</table>

Coil Operating Voltage (valid over temperature range)

| Voltage (will operate)                 | 9-36VDC |
| Voltage (Max.)                        | 36VDC |
| Pickup (close) Voltage Max.           | 9VDC |
| Hold Voltage (Min.)                   | 7VDC |
| Dropout (open) Voltage (Min.)         | 6VDC |
| Inrush Current (Max.)                 | 3.8A |
| Holding Current (Avg.)                | 0.13A@12V, 0.07A@24V, 0.03A@48V, 0.02A@72V |
| Inrush Time (Max.)                    | 130ms, 130ms, 130ms |

Part Numbering System

Typical Part Number

| Series: AC30 = Multipole, 60 Amp, 600VAC, 3-pole Contactor |
| Contact Form: A = Normally Open |
| Coil Voltage: A = 9-36VDC, B = 32-95VDC, J = 48-95VDC |
| Coil Wire Length: A = 15.3 in (390 mm) |
| Coil Terminal Connector: N = None |
| Mounting & Power Terminals: A = Bottom Mount & #10-32 Pan Head Screws |

Outline Dimensions

- 2 X .550 ± .020 (13.97 ± .51)
- 2 X .50 ± .010 (12.70 ± .26)
- 2.749 ± .005 (69.92 ± .13)
- 2.04 ± .025 (51.84 ± .63)
- 2.51 ± .025 (63.74 ± .63)
- 1.204 ± .020 (30.60 ± .51)
- 2.29 DIA. ± .020 (58.19 ± .51)
- 2.37 ± .025 (60.30 ± .63)
- 2.805 ± .005 (71.25 ± .13)
- 3.166 ± .005 (80.42 ± .13)

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents. Specifications subject to change.

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.

[Image of AC30 Series Contactors]

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
AP50X - 50 Amps Contactor

Product Facts
- 15 A carry, 200 A overload @ 270 Vdc
- Ideal for circuit protection and control
- Versatile power, voltage, and current operating range
- Bi-directional power switching
- Fast operate and release time
- Low power consumption
- Vacuum-sealed contacts; can operate in harsh environments
- Space-rated version built in accordance with customers SCD
- Meets many requirements of MIL-PRF-32085

Contact Ratings*

Switching Current
- Maximum continuous current carry = 50 Amps

*Based on data extrapolated from qualification at 270 Vdc with resistive load. Since each application is unique, user is encouraged to verify rating in actual application.

Product Specifications
- SPST-NO Contact Arrangement
- X Contact Form
- Rated Resistive Load @ 270 Vdc — 50 A
- Continuous Current Carry, Max. — 50 A
- Overload @ 270 Vdc — 200 A
- Contact Resistance, Max. — 4 mohm

Dielectric at Sea Level — Coil to Power Terminals — 1.800 Vrms
- All Other Points — 2.000 Vrms
- Shock, 11ms, 1/2 Sine (Peak) — 30 g
- Vibration, Sinusoidal (55-2000 Hz, Peak) — 20 g
- Operating Ambient Temperature Range — -55°C to +85°C
- Load Life @ 270 Vdc, Min. — 50,000 cycles
- Operate Time, Excluding Bounce, Max. — 27 ms
- Release Time, Max. — 10 ms
- Bounce Time, Max. — 8 ms
- Insulation Resistance @ 500 Vdc, Min. — Initial — 100 mohm
- End of Life — 50 mohm
- Weight, Nominal — 454 gram (16 oz.)

Coil Data

<table>
<thead>
<tr>
<th>Volts, Nominal</th>
<th>12</th>
<th>28</th>
<th>120</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max.</td>
<td>9.9 Vdc</td>
<td>23 Vdc</td>
<td>99 Vdc</td>
</tr>
<tr>
<td>Dropout, Min.</td>
<td>.4 Vdc</td>
<td>1.0 Vdc</td>
<td>4.0 Vdc</td>
</tr>
<tr>
<td>Coil Resistance (±10%)</td>
<td>19 Ω</td>
<td>103 Ω</td>
<td>1890 Ω</td>
</tr>
<tr>
<td>Energy, Magnetic, Max.</td>
<td>.05 J</td>
<td>.05 J</td>
<td>.05 J</td>
</tr>
</tbody>
</table>

Coil resistance rated at 25°C

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.

Ordering Information

Sample Part Number ▶ AP50 X B 5 7

Contact Form:
- X = SPST-NO Double Make

Coil Voltage:
- A = 12 Vdc, Stud Terminals
- B = 28 Vdc, Stud Terminals
- C = 120 Vdc, Stud Terminals

Power Terminals:
- 5 = Stud Terminals

Mounting:
- 7 = Panel Mount

---

Tyco Electronics

KILOVAC 270+ Vdc Traditional Aerospace Contactors

Catalog 5-1773450-5
Revised 9-08
www.tycoelectronics.com

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.

Dimensions are shown for reference purposes only. Specifications subject to change.

USA: 1-800-522-6752
Canada: 1-905-470-4425
Mexico: 01-800-733-8926
C. America: 82-55-1106-0803
South America: 55-11-2103-6000
Hong Kong: 852-2735-1628
Japan: 81-44-844-8013
UK: 44-8706-080-208

Compiled 7-37

KILOVAC 270+ Vdc Traditonal Contactors
KILOVAC 270+ Vdc Traditional Aerospace Contactors

AP90X-05 - 90 Amps SPUD Contactor

Product Facts
- 90 A carry, 350 A overload @ 270 Vdc
- Same size and weight as AP50X
- Versatile power, voltage, and current operating range
- Ideal for circuit protection and control
- Bi-directional switching
- Fast operate and release time
- Low power consumption
- Vacuum-sealed contacts; can operate in harsh environments
- Space-rated version built in accordance with customers SCD
- Meets many requirements of MIL-PRF-32085

Product Specifications

Contact Arrangement — SPST-NO
Contact Form — X
Rated Resistive Load @ 270 Vdc — 90 A
Continuous Current Carry, Max. — 65 A
Overload @ 270 Vdc — 350 A
Contact Resistance, Max. — 2 mohm

Dielectric at Sea Level —
Coil to Power Terminals — 1,800 Vrms
All Other Points — 2,000 Vrms
Shock, 11ms, 1/2 Sine (Peak) — 30 g
Vibration, Sinusoidal (55-2000 Hz, Peak) — 20 g
Operating Ambient Temperature Range — -55°C to +90°C
Load Life @ 270 Vdc, Min. — 25,000 cycles

Operate Time, Excluding Bounce, Max. — 35 ms
Release Time, Max. — 10 ms
Bounce Time, Max. — 8 ms
Insulation Resistance @ 500 Vdc, Min. —
Initial — 100 mohm
End of Life — 50 mohm
Weight, Nominal — 454 gram (16 oz.)

Coil Data

Volts, Nominal  12   28   120
Pickup, Max.  9.9 Vdc  23 Vdc  99 Vdc
Dropout, Min.  .4 Vdc  1.0 Vdc  4.0 Vdc
Coil Resistance (+10%)  19 Ω  103 Ω  1890 Ω
Energy, Magnetic, Max.  .05 J  .05 J  .05 J

Coil resistance rated at 25°C

*Based on data extrapolated from qualification at 270 Vdc with resistive load. Since each application is unique, user is encouraged to verify rating in actual application.
Product Facts

- 90 A carry, 350 A overload @ 270 Vdc
- Same size and weight as AP50X
- Versatile power, voltage, and current operating range
- Ideal for circuit protection and control
- Bi-directional switching
- Fast operate and release time
- Low power consumption
- Vacuum-sealed contacts; can operate in harsh environments
- Space-rated version built in accordance with customers SCD
- Meets many requirements of MIL-PRF-32085

AP90X - 90 Amps SPUD Contactor

Contact Ratings*

<table>
<thead>
<tr>
<th>Switching Current</th>
<th>10 A</th>
<th>100 A</th>
<th>10,000 A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycles</td>
<td>100,000</td>
<td>100,000</td>
<td>100,000</td>
</tr>
</tbody>
</table>

Maximum continuous current carry = 90 Amps

*Based on data extrapolated from qualification at 270 Vdc with resistive load. Since each application is unique, user is encouraged to verify rating in actual application.

Product Specifications

Contact Arrangement — SPST-NO
Contact Form — X
Rated Resistive Load @ 270 Vdc — 90 A
Continuous Current Carry, Max. — 90 A
Overload @ 270 Vdc — 350 A
Contact Resistance, Max. — 2 mohm

Dielectric at Sea Level
- Coil to Power Terminals — 1,800 Vrms
- All Other Points — 2,000 Vrms

Shock, 11ms, 1/2 Sine (Peak) — 30 g

Vibration, Sinusoidal (55-2000 Hz, Peak) — 20 g
Operating Ambient Temperature Range — -55°C to +85°C
Load Life @ 270 Vdc, Min. — 25,000 cycles

Operate Time, Excluding Bounce, Max. — 27 ms
Release Time, Max. — 10 ms
Bounce Time, Max. — 8 ms
Insulation Resistance @ 500 Vdc, Min.
- Initial — 100 mohm
- End of Life — 50 mohm
Weight, Nominal — 454 gram (16 oz.)

Coil Data

<table>
<thead>
<tr>
<th>Volts, Nominal</th>
<th>12</th>
<th>28</th>
<th>120</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max.</td>
<td>9.9 Vdc</td>
<td>23 Vdc</td>
<td>99 Vdc</td>
</tr>
<tr>
<td>Dropout, Min.</td>
<td>4 Vdc</td>
<td>1.0 Vdc</td>
<td>4.0 Vdc</td>
</tr>
<tr>
<td>Coil Resistance (±10%)</td>
<td>19 Ohm</td>
<td>103 Ohm</td>
<td>1890 Ohm</td>
</tr>
<tr>
<td>Energy, Magnetic, Max.</td>
<td>.05 J</td>
<td>.05 J</td>
<td>.05 J</td>
</tr>
</tbody>
</table>

Coil resistance rated at 25°C

Ordering Information

Sample Part Number

AP90 X B 5 7

Series:

Contact Form:
- X = SPST-NO Double Make

Coil Voltage:
- A = 12 Vdc, Stud Terminals
- B = 28 Vdc, Stud Terminals
- C = 120 Vdc, Stud Terminals

Power Terminals:
- 5 = Stud Terminals

Mounting:
- 7 = Panel Mount

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.

USA: 1-800-522-6752
Canada: 1-905-470-4425
Mexico: 01-800-733-8926
C. America: 02-65-1106-0803
South America: 55-11-2103-6000
Hong Kong: 852-2735-1628
Japan: 81-44-844-8013
UK: 44-8706-080-208

www.tycoelectronics.com
AP150X (Form X, Electrically Held) & AP150P (Form P, Latching) 150 Amps

CZONKA Contactor
Product Facts
- 150 A carry, 500 A overload @ 270 Vdc
- Suitable for circuit protection, control, and battery switching
- Versatile power, voltage, and current operating range
- Bi-directional switching
- Electrically held and latching coil versions
- Fast operate and release time
- Low power consumption
- Vacuum-sealed contacts; can operate in harsh environments
- Space-rated version built in accordance with customers SCD
- Meets many requirements of MIL-PRF-32085

Product Specifications
Contact Arrangement —
AP150X — SPST-NO
AP150P — SPST
Contact Form —
AP150X — X
AP150P — P
Rated Resistive Load @ 270 Vdc —
150 A
Continuous Current Carry, Max. —
150 A
Overload Make & Break @ 270 Vdc —
400/500 A* 
Contact Resistance, Max. —
1 mohm
Dielectric at Sea Level —
Power Terminalsto Terminal —
2,000 V rms
Power Terminalsto All Other Points —
1,800 V rms
Shock, 11ms, 1/2 Sine (Peak) —
35 g
Vibration, Sinusoidal (55-2000 Hz, Peak) —
20 g
Operating Ambient Temperature Range —
-55°C to +85°C
Load Life @ 270 Vdc, Min. —
10,000 cycles
Operate Time (28 Vdc, 25°C) —
Close (Includes Bounce), Typ. —
AP150X — 35 ms
AP150P — 15 ms
Bounce (After Close Only), Max. —
AP150X — 8 ms
AP150P — 5 ms
Open (Includes Arcing), Max. —
AP150X — 10 ms
AP150P — 15 ms
Insulation Resistance @ 500 Vdc, Min. —
Initial/End of Life — 100 mohm/50 mohm
Weight, Nominal —
1.66 lb (0.753 kg)

Note:
*500 A at beginning of life which is 0 to 5,000 cycles, 400 A = at end of life which is 5,000 to 10,000 cycles.

Coil Data
AP150X AP150P
Voltage, Nominal* 28 Vdc 28 Vdc
Pickup (Close), Max. 23 Vdc 20 Vdc
Dropout (Open), Max. 1.0 Vdc 20 Vdc
Coil Resistance @ 25°C (10%) 52 Ω 13 Ω**
Coil Duty, Recommended Continuous 100 ms to Toggle
Coil Energy, Max. 0.10 J 0.10 J
Coil Clamping 2.5 x nom. 500W/ms TVS

*12, 120 Vdc, or other special coil voltages available upon request.
**2 coils are used, both are high common. Switch coil power from low side. High side coil power switch is a special order.

Ordering Information
Sample Part Number —
AP150 X B 5 7

Series:
Contact Form:
X = SPST-NO Electrically Held
P = SPST, Latching
Coil Voltage:
A = 12 Vdc, Stud Terminals, .138-32
B = 28 Vdc, Stud Terminals, .138-32
C = 120 Vdc, Stud Terminals, .138-32
Power Terminals:
5 = Stud Terminals, .375-24
Mounting:
7 = Panel Mount

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
CZONKA II Contactor

Product Facts
- 265 A carry, 1000 A overload @ 270 Vdc
- Bi-directional power switching
- Auxiliary Contacts
- Electrically held and latching coil versions
- Built-in coil drivers for electrically held (SW hold) and latching (coil pulser)
- Coil divers EMC qualified to most of the requirements of MIL-STD-461D
- Versatile power, voltage, and current operating range
- Excellent for safety disconnect and transfer switch applications
- Designed for main generator loads
- Suitable for circuit protection and control
- Remote Power Controller version with overload protection available — contact factory for more information
- Hermetically-sealed contacts; can operate in harsh environments
- Space-rated version built in accordance with customers SCD
- Meets many requirements of MIL-PRF-32085

Product Specifications

Contact Arrangement Mains —
AP265X — Form X — SPST-NO
Form A — 2 x SPST-NO
AP265P — Form X — SPST
Form A — 2 x SPST

Polarity (Carry and Switching) —
Bi-directional

Rated Resistive Load @ 270 Vdc —
265 A

Continuous Current Carry, Max. —
265 A

Overload Current @ 270 Vdc, Max. —
Make and Break — 600 A
Break Only — 1000 A

Contact Resistance, Max. —
0.3 mohm

Dielectric at Sea Level (< 1 mA leakage) —
Power Terminals to Terminal — 1,000 Vrms
Power Terminals to All Other Points — 1,000 Vrms

Shock, 11ms, 1/2 Sine (Peak) —
25 g

Vibration, Sinusoidal (55-2000 Hz, Peak) — 10 g

Operating Ambient Temperature Range — -55°C to +85°C

Load Life @ 270 Vdc, Min. —
See graph above

Operate Time (28 Vdc, 25°C) —
Close (Includes Bounce), Typ. —
AP265X — 20 ms
AP265P — 10 ms

Bounce (After Close Only), Max. —
5 ms

Open (Includes Arcing), Max. —
15 ms

Insulation Resistance @ 500 Vdc, Min. —
Initial/End of Life — 100 mohm/50 mohm

Weight, Nominal —
1.7 lb (0.77 kg)

Electrical Life Cycles vs Power Switching

(Data from 270 Vdc testing @ 265A, 95% Weibull Reliability)

Coil Data

AP265X

Type Driver — “PWM” Econ.
Voltage, Nominal — 28 Vdc
Pickup (Close), Max. — 20 Vdc
Dropout (Open), Max. — 11 Vdc
Current @ 28 V, 25°C —
Inrush — 1.8 A
Inrush Time, Max. — 100 ms

AP265P

Type Driver — Pulser
Voltage, Nominal — 28 Vdc
Pickup (Close), Max. — 12 Vdc
Dropout (Open), Max. — 12 Vdc
Current @ 28 V, 25°C —
Inrush — 2.6 A
Inrush Time, Max. — 100 ms

Ordering Information

Sample Part Number

AP265X E 9 7

Series:

Contact Form:
X = SPST-NO, Electrically Held
P = SPST, Latching

Coil Voltage:
E = 28 Vdc

Power Terminals:
9 = Female Threads, .250-20

Mounting:
7 = Panel Mount, Helcoil Locking

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
**Product Facts**

- 500 A carry, 1200 A make, 3000 A break @ 270 Vdc
- Bi-directional power switching
- Auxiliary Contacts
- Built-in coil power economizing — 6 W holding
- Versatile power, voltage, and current operating range
- Excellent for safety disconnect and transfer switch applications
- Suits for circuit protection control
- Hermetically-sealed contacts; can operate in harsh environments
- Designed for main generator loads
- Space-rated version built in accordance with customers SCD
- Meets many requirements of MIL-PRF-32085

**AP350X “BUBBA” Contactor 500 Amps**

**Product Specifications**

Contact Arrangement with Auxiliary Contact (28 Vdc, 0.1 A)
- Form X — SPST-NO
- Form A — SPST-NO

Rated Resistive Load @ 270 Vdc,
- 85°C — 350 A

Continuous Current Carry, Max.,
- 25°C — 500 A

Overload Current @ 270 Vdc,
- Max.
  - Make (Closed Into) — 1200 A
  - Break (Open) — 3000 A

Contact Resistance, Max.
- 0.2 mohm

Dielectric at Sea Level
- (≤1 mA leakage)
  - Open Power Terminal to Terminal — 2,000 Vrms
  - Closed Power Terminals to All Other Points — 2,000 Vrms

Shock, 11ms, 1/2 Sine (Peak)
- 25 g

Vibration, Sinusoidal
- (55-2000 Hz, Peak) — 10 g

Operating Ambient Temperature Range
- -55°C to +85°C

Load Life @ 270 Vdc, Min.
- See graph above

Operate Time @ 25°C
- Close (Includes Bounce), Typ.
  - 35 ms
- Bounce (Occurs When Closing), Max.
  - 5 ms
- Open (Includes Arcing), Max.
  - 20 ms

Insulation Resistance @ 500 Vdc, Min.
- 10 mohm/50 mohm

Weight, Nominal
- 3.35 lb (1.52 kg)

**Coil Data**

<table>
<thead>
<tr>
<th>Type Driver</th>
<th>AP350X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage, Nominal</td>
<td>28 Vdc</td>
</tr>
<tr>
<td>Pickup (Close), Max.</td>
<td>20 Vdc</td>
</tr>
<tr>
<td>Dropout (Open), Max.</td>
<td>11 Vdc</td>
</tr>
<tr>
<td>Current @ 28 V, 25°C</td>
<td>—</td>
</tr>
<tr>
<td>Inrush</td>
<td>2.1 A</td>
</tr>
<tr>
<td>Holding (Standby)</td>
<td>0.21 A</td>
</tr>
<tr>
<td>Inrush Time, Max.</td>
<td>200 ms</td>
</tr>
</tbody>
</table>

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.

**Ordering Information**

Sample Part Number

AP350 X B 5 7

**Series:**

**Contact Form:**

X = SPST-NO Double Make

**Coil Voltage:**

B = 28 Vdc, Stud Terminals

**Power Terminals:**

5 = Screw Terminals

**Mounting:**

7 = Panel Mount, captive bolts

Refer to EV500 Sales Drawing for complete specifications.

---

Catalog 5-1773450-5
Revised 9-08
www.tycoelectronics.com
KILOVAC 28-1800 Vdc Traditional Contactors

PD90X - 90 Amps Make & Break Load Switching

Product Facts
- Vacuum dielectric for power switching
- 90 A carry, 350 A overload @ 320 Vdc
- Versatile power, voltage, and current operating range
- Ideal for circuit protection and control
- Bi-directional switching
- Fast operate and release time
- Low power consumption
- Vacuum-sealed contacts; can operate in harsh environments
- Optimized for power switching

Product Specifications
Contact Arrangement — SPST-NO
Contact Form — X
Rated Resistive Load @ 320 Vdc — 90 A
Continuous Current Carry, Max., 85°C — 90 A
Overload (Make/Break) @ 320 Vdc — 350
Load Life @ 270 Vdc, Min. — 25,000 cycles
Contact Resistance, Max. — 0.002 ohm
Dielectric at Sea Level — Power Terminals to Coil and All Other Points — 1,800 Vrms
Shock, 11ms, 1/2 Sine (Peak) — 25 g
Vibration, Sinusoidal (55-2000 Hz, Peak) — 5 g
Operating Ambient Temperature Range — -40°C to +85°C
Operate Time, Max., Including Bounce @ 25°C — 35 ms
Release Time, Max. — 10 ms
Bounce Time, Max. — 8 ms
Insulation Resistance @ 500 Vdc, Min. — Initial/End of Life — 100 mohm/50 mohm
Weight, Nominal — 454 g (16 oz)

Coil Data
<table>
<thead>
<tr>
<th>Volts, Nominal</th>
<th>12 Vdc</th>
<th>24 Vdc</th>
<th>125 Vdc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max. @ 85°C</td>
<td>9.9 Vdc</td>
<td>19.5 Vdc</td>
<td>102 Vdc</td>
</tr>
<tr>
<td>Hold, Min. @ 85°C</td>
<td>4.3 Vdc</td>
<td>8.7 Vdc</td>
<td>45 Vdc</td>
</tr>
<tr>
<td>Dropout, Min. @ -40°C</td>
<td>0.6 Vdc</td>
<td>1.4 Vdc</td>
<td>6.0 Vdc</td>
</tr>
<tr>
<td>Coil Resistance (±10%)</td>
<td>19 Ω</td>
<td>76 Ω</td>
<td>1890 Ω</td>
</tr>
<tr>
<td>Energy, Magnetic, Max.</td>
<td>.05 J</td>
<td>.05 J</td>
<td>.05 J</td>
</tr>
</tbody>
</table>

Coil resistance rated at 25°C

Contact Ratings*

*Specifications subject to change.

Ordering Information
Sample Part Number
PD90 X B 5 7
Series: 7
Contact Form: X = SPST-NO, Double Make
Coil Voltage:
A = 12 Vdc, Stud Terminals
B = 24 Vdc, Stud Terminals
C = 125 Vdc, Stud Terminals
Power Terminals:
5 = Stud Terminals
7 = Panel Mount

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
PD150X - 150 Amps CZONKA Make & Break Load Switching

Product Facts
- Vacuum dielectric for power switching
- 150 A carry, 500 A overload @ 320 Vdc
- Suited for circuit protection, control, and battery switching
- Versatile power, voltage, and current operating range
- Bi-directional switching
- Fast operate and release time
- Low power consumption
- Vacuum-sealed contacts; can operate in harsh environments
- Latching version available, contact Tyco Electronics for more information
- Optimized for power switching

Product Specifications

- Contact Arrangement — SPST-NO
- Contact Form — X
- Rated Resistive Load @ 320 Vdc — 150 A
- Continuous Current Carry, Max., 85°C — 150 A
- Overload (Make/Break) @ 320 Vdc — 500/400 A***
- Load Life @ 320 Vdc, Min. — 10,000 cycles
- Mechanical Life, Min. — 100,000 cycles
- Contact Resistance, Max. — 0.001 ohm
- Dielectric at Sea Level — Power Terminals to Coil and All Other Points — 1,800 Vrms
- Shock, 11ms, 1/2 Sine (Peak) — 25 g
- Vibration, Sinusoidal (55-2000 Hz, Peak) — 5 g
- Operating Ambient Temperature Range — -40°C to +85°C
- Operate Time, Max., Including Bounce @ 25°C — 40 ms
- Release Time, Max. — 10 ms
- Bounce Time, Max. — 8 ms
- Insulation Resistance @ 500 Vdc, Min. — Initial/End of Life — 100 mohm/50 mohm
- Weight, Nominal — 770 g (27 oz)

Note:
- ***500 A at beginning of life which is 0 to 5,000 cycles, 400 A at end of life which is 5,000 to 10,000 cycles

Coil Data

- Volts, Nominal 12 Vdc 24 Vdc 125 Vdc
- Max. Coil Voltage 14 Vdc 28 Vdc 145 Vdc
- Pickup, Max. @ 85°C 9.9 Vdc 19.5 Vdc 102 Vdc
- Hold, Min. @ 85°C 4.3 Vdc 8.7 Vdc 45 Vdc
- Dropout, Min. @ -40°C .6 Vdc 1.4 Vdc 6.0 Vdc
- Coil Resistance (±10%) 9.6 Ω 52 Ω 960 Ω
- Energy, Magnetic, Max. .10 J .10 J .10 J

Coil resistance rated at 25°C

Contact Ratings*

- Ratings for load power make, carry, & break based on data extrapolated from 270 Vdc and 540 Vdc testing with resistive load. Since each application is unique, user is encouraged to verify rating in actual application.

Contact Rating Notes:
1. Maximum continuous current carry = 150A @ Ta = 85°C
2. Maximum interrupt power = 160kW @ 25µH, across voltage range -0 to 600 Vdc

Ordering Information

- Sample Part Number /H17075
- Series: PD150 X B 5 7
- Contact Form: X = SPST-NO, Double Make
- Coil Voltage: A = 12 Vdc, Stud Terminals
- B = 24 Vdc, Stud Terminals
- C = 125 Vdc, Stud Terminals
- Power Terminals: 5 = Stud Terminals
- Mounting: 7 = Panel Mount

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
Ev250-1a & 1b 400 Amps Czonka-Ii Evx Make & Break Load Switching

Product Facts

- Hydrogen dielectric for power switching high current loads
- 400 A carry, 2,500 A interrupt @ 320 Vdc
- Suited for circuit protection, control, battery switching, and main power safety disconnect
- Versatile power, voltage, and current operating range: 28-1800 Vdc tested
- Low-cost compact version for volume production applications. Requires external coil economizer (PWM or lower hold voltage)
- “Hammer effect” mechanism breaks light contact welds
- “Super-sealed” environment chamber uniquely protects all moving parts
- Can operate in harsh environments
- Moving contact rotates to provide fresh contact surface for low contact resistance and low power consumption
- Sealed control connector. Mating connector with flying leads part number 9913
- High temperature (135°C) model with 10 inch flying leads available (-4A — Call Tyco Electronics for sales drawing)
- Bi-directional power switching
- Fast operate and release time

Product Specifications

- Contact Arrangement — SPST-NO
- Contact Form — X
- Continuous Current Carry, Max. — 400 A; 6.5 Minutes — 500 A
- Break Current @ 320 Vdc — 2,500 A
- Contact Resistance, Max. — 0.0003 ohm
- Contact Resistance, Typ. — 0.0001 – 0.0002 ohm
- Dielectric at Sea Level (Leakage < 1mA) — 2,200 Vrms
- Shock, 11ms, 1/2 Sine (Peak), Operating — 30 g
- Vibration, Sinusoidal (80-2000 Hz, Peak) — 20 g
- Operating Ambient Temperature Range — -40°C to +85°C
- Load Life — See chart on next page
- Insulation Resistance@ 500 Vdc, Min. — 100 mohm
- Weight, Nominal — 1.54 lb (0.7 kg)

Contact Ratings*

- Voltage, Nominal* — 12 Vdc 24 Vdc
- Pickup (Close), Max. — 8.3 Vdc 16.6 Vdc
- Continuous Hold, Max./Min.** — 5.1/3.8 Vdc 10.2/6.6 Vdc
- Dropout (Open), Min. — 0.88 - 3.3 Vdc 2.4 - 6.6 Vdc
- Coil Resistance @ 25°C, ±10% — 3 Ω 12 Ω
- Coil Energy, Max. — 0.2 J 0.2 J
- Coil Clamping — 3 x nom. 3 x nom.

*Do not apply continuously. Requires external coil economizer. Other special coil voltages available upon request.
**At maximum continuous current and maximum ambient temperature. Hold voltage must be maintained within the limits specified to keep contacts closed and to prevent coil overheating.
***Do not use a free wheeling diode or capacitor across the coil.

Ordering Information

Sample Part Number ▶

Series:

Coil Voltage:
A = 12 Vdc, Nominal
B = 24 Vdc, Nominal

For detailed specifications and recommendations, refer to the Ev250-1A & B sales drawings.
Life Ratings and Qualification Test Plan

<table>
<thead>
<tr>
<th>Test #</th>
<th>Normal Operations</th>
<th>Abnormal Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load Type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Pre Charge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switch Mode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sequence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>10K cycles</td>
<td>10 cycles</td>
</tr>
<tr>
<td>2</td>
<td>10K</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>10K</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>10K</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>10K</td>
<td>10</td>
</tr>
<tr>
<td>Etc.</td>
<td>Continue Cycling to Relay Failure</td>
<td></td>
</tr>
</tbody>
</table>

The testing objective is to verify proper relay function for a given number of consecutive and cumulative cycles under both normal and abnormal conditions in a variety of load switching applications. The life rating of 40K cycles minimum was calculated with 95% Weibull reliability.

Electrical Data
(Over Temperature Range — Max. Terminal Temp. = 200°C)

Make/Break Life for Capacitive & Resistive Loads at 320 Vdc 1,2 —
1. @ 90% Capacitive Pre-Charge — 50,000 cycles
2. @ 70% Capacitive Pre-Charge — 50 cycles
3. @ -250 A (2 Consecutive, Reverse Polarity) 1 — 10 cycles
4. @ 3300 A (Break only, 2 Consecutive) 1 — 4 cycles

Mechanical Life — 100,000 cycles

Notes:
1. Resistive load includes inductance
L = 25 µH, Load @ 2500 A tested
2. Conductor: 2 each of copper
54 m.m² (AWG 0) required for
> 250 A carry. 1 Copper (AWG 0)
conductors recommended for < 250 A

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
KILOVAC 28-1800 Vdc Traditional Contactors

EV250-2A & 2B 400 Amps CZNKA II EVX Make & Break Load Switching

Product Facts
- Hydrogen dielectric for power switching high current loads
- 400 A carry, 2,500 A interrupt @ 320 Vdc
- Suited for circuit protection, control, battery switching, and main power safety disconnect
- Versatile power, voltage, and current operating range: 28-1800 Vdc tested
- Internal coil economizer provides:
  - 4W typical hold power independent of temperature & voltage range
  - EMI spectrum tested and approved
  - Built-in coil suppression
- “Hammer effect” mechanism breaks light contact welds
- Hermetically “Super-sealed” environment chamber uniquely protects ALL moving parts
- Can operate in harsh environments
- Moving contact rotates to provide fresh contact surface for low contact resistance and low power consumption
- Sealed control connector. Mating connector with flying leads Part Number 2005 available
- Special versions available:
  - Economical (-8A/B) for light duty power switching (without arc blowout magnets)
  - 10 inch flying leads model (-7A)

Product Specifications
- Contact Arrangement — SPST-NO
- Contact Form — X
- Continuous Current Carry, Max. —
  - 400 A, 6.5 Minutes — 500 A
- Break Current @ 320 Vdc — 2,500 A
- Contact Resistance, Max. — 0.0003 ohm
- Contact Resistance, Typ. — 0.0001 – 0.0002 ohm
- Dielectric at Sea Level (Leakage < 1mA) — 2,200 Vrms
- Shock, 11ms, 1/2 Sine (Peak), Operating — 30 g
- Vibration, Sinusoidal (80-2000 Hz, Peak) — 20 g
- Operating Ambient Temperature Range — -40°C to +85°C
- Load Life — See chart on next page
- Operate Time, @ 25°C —
  - Close (Includes Bounce), Typ. — 18 ms
  - Bounce (After Close Only), Max. — 5 ms
  - Release Time (Includes Arcing), Max. — 15 ms
  - Insulation Resistance @ 500 Vdc, Min. — 100 mohm
  - Weight, Nominal — 1.76 lb (0.8 kg)

Contact Ratings*

<table>
<thead>
<tr>
<th>Voltage, Nominal</th>
<th>EV250-2A</th>
<th>EV250-2B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage, Nominal</td>
<td>12 Vdc</td>
<td>24 Vdc</td>
</tr>
<tr>
<td>Pickup (Close), Max.</td>
<td>9 Vdc</td>
<td>18 Vdc</td>
</tr>
<tr>
<td>Hold, Min.</td>
<td>7 Vdc</td>
<td>14 Vdc</td>
</tr>
<tr>
<td>Dropout (Open), Min.</td>
<td>5 Vdc</td>
<td>10 Vdc</td>
</tr>
<tr>
<td>Inrush</td>
<td>2.8 A</td>
<td>1.8 A</td>
</tr>
<tr>
<td>Holding, Standby</td>
<td>0.34 A</td>
<td>0.11 A</td>
</tr>
<tr>
<td>Inrush Time, Max.</td>
<td>200 ms</td>
<td>200 ms</td>
</tr>
</tbody>
</table>

Coil Data**

- Other special coil voltages available upon request.
- Do not use a free wheeling diode or capacitor across the coil. Built in suppression limits back EMF to zero volts.

Ordering Information

Sample Part Number

<table>
<thead>
<tr>
<th>Series:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model:</td>
</tr>
<tr>
<td>2 = With Blowout Magnets</td>
</tr>
<tr>
<td>8 = Without Blowout Magnets</td>
</tr>
<tr>
<td>7 = 10” Flying Leads (12 V, with Magnets Only)</td>
</tr>
</tbody>
</table>

Coil Voltage:

For detailed specifications and recommendations, refer to the EV250-2A & B or 7A sales drawings.
KIROVAC 28-1800 Vdc Traditional Contactors

EV250-2A & 2B 400 Amps CZONKA II EVX Make & Break Load Switching (Continued)

**Contact Life Ratings and Qualification Test Plan**

<table>
<thead>
<tr>
<th>Test #</th>
<th>Normal Operations</th>
<th>Abnormal Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Current</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage</td>
<td>Reference Graph and Test Circuit Diagram (Sht. 8)</td>
<td>320 V</td>
</tr>
<tr>
<td>Load Type</td>
<td>Capacitive</td>
<td>Capacitive</td>
</tr>
<tr>
<td>% Pre Charge</td>
<td>90%</td>
<td>70%</td>
</tr>
<tr>
<td>Switch Mode</td>
<td>Make Only</td>
<td>Make Only</td>
</tr>
<tr>
<td>Sequence</td>
<td>10 K cycles</td>
<td>10 cycles</td>
</tr>
<tr>
<td></td>
<td>10 K</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>10 K</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>10 K</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>10 K</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Continue Cycling to Relay Failure</td>
<td></td>
</tr>
</tbody>
</table>

The testing objective is to verify proper relay function for a given number of consecutive and cumulative cycles under both normal and abnormal conditions in a variety of load switching applications. The life rating of 40K cycles minimum was calculated with 95% Weibull reliability.

**Electrical Data**
(Over Temperature Range — Max. Terminal Temp. = 200°C)

Make/Break Life for Capacitive & Resistive Loads at 320 Vdc

<table>
<thead>
<tr>
<th>Condition</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>@ 90% Capacitive Pre-Charge</td>
<td>50,000 cycles</td>
<td>50 cycles</td>
<td>50 cycles</td>
</tr>
<tr>
<td>@ 70% Capacitive Pre-Charge</td>
<td>50 cycles</td>
<td>50 cycles</td>
<td>50 cycles</td>
</tr>
<tr>
<td>@ -250 A (2 Consecutive, Reverse Polarity)</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>@ 3300 A (Break only, 2 Consecutive)</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

Mechanical Life — 100,000 cycles

**Notes:**
1. Resistive load includes inductance L = 25 µH. Load @ 2500 A tested @ 200 µH.
2. Conductor: 2 each of copper 54 mcm (AWG 0) required for > 250 A carry. Copper (AWG 0) conductor recommended for ≤ 250 A.

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
**Product Facts**
- Very high power sealed contactor
- Hydrogen dielectric for power switching high current loads
- Excellent for safety disconnect and transfer switch applications
- Suited for circuit protection control
- Hermetically “Super-sealed” environment uniquely protects contacts and all moving parts; can operate in harsh environments
- 600-1000 A continuous carry, dependent on temperature and conductors used
- 3,300 A interrupt, 1,000 A make, @ 320 Vdc
- 12 and 24 volt coil control options. Call Tyco Electronics for custom options
- 360 kW power switch capable
- 200°C hot power terminals capable
- Bi-directional power switching
- Auxiliary contacts optional
- Built-in dual power coil economizer, 8W holding typical
- Versatile power, voltage, and current operating range: 28-1800 Vdc*

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.

---

**EV500 “BUBBA” Contactor 600 Amps, Make & Break Load Switching**

**Product Specifications**
- Contact Arrangement with Auxiliary Contacts
  - Form X — SPST-NO
  - Form A — SPST-NO
- Rated Resistive Load @ 270 Vdc, 85°C (Continuous/10 sec) — 600 A/1,600 A
- Continuous Current Carry, Max., 25°C — 750 A
- Overload Current @ 320 Vdc, Max. — Make (Closed Into) — 1,000 A
  - Break (Open) — 3,300 A
- Contact Resistance, Max. — 0.0002 ohm
- Dielectric at Sea Level (Leakage < 1mA)
  - Open Power Terminal to Terminal — 2,000 Vrms
  - Closed Power Terminals to All Other Points — 2,000 Vrms
- Shock, 11ms, 1/2 Sine (Peak), Operating — 30 g
- Vibration, Sinusoidal (80-2000 Hz, Peak) — EV500-5 — 5 g
  - EV500-4 — 10 g
- Operating Ambient Temperature Range — -40°C to +85°C
- Load Life (Mechanical/Electrical) 2 — See next page
- Operate Time @ 25°C
  - Close (Includes Bounce), Typ. — 40 ms
  - Bounce (After Close Only), Max. — 5 ms
- Release Time (Includes Arcing), Max. at 2500 A — 20 ms
- Insulation Resistance @ 500 Vdc, Min. — 100 mohm
- Weight, Nominal — 3.38 lb (1.53 kg)

**Notes:**
1. Current Carry: 750 A @ 25°C. Derate 2.5 A/C to 600 A @ 85°C for still air, no heat sink. Reference National Electric Code for specific conductor size recommendation versus current. For > 600 A carry, call Tyco Electronics and request the “EV500 Current Carry study” for additional data.
2. See EV500 sales drawing for complete specifications, including normal capacitive pre-charge make, plus abnormal make and break ratings.

**Coil Data**

<table>
<thead>
<tr>
<th></th>
<th>12 V</th>
<th>24 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type Driver</td>
<td>2 Coil Electronic</td>
<td></td>
</tr>
<tr>
<td>Volts, Nominal</td>
<td>12 Vdc</td>
<td>24 Vdc</td>
</tr>
<tr>
<td>Pickup (Close), Max.</td>
<td>9.9 Vdc</td>
<td>19.7 Vdc</td>
</tr>
<tr>
<td>Hold, Min.</td>
<td>9 Vdc</td>
<td>18 Vdc</td>
</tr>
<tr>
<td>Dropout (Open), Min.</td>
<td>2 Vdc</td>
<td>4 Vdc</td>
</tr>
<tr>
<td>Current (@ VaNom / 25°C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inrush</td>
<td>3.3 A</td>
<td>1.7 A</td>
</tr>
<tr>
<td>Holding, Standby</td>
<td>0.74 A</td>
<td>0.37 A</td>
</tr>
<tr>
<td>Inrush Max.</td>
<td>300 ms</td>
<td>300 ms</td>
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**Ordering Information**

**Sample Part Number**

<table>
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<tr>
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<th>EV500 4 A</th>
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<tr>
<td>Series</td>
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<td>Auxiliary Contacts:</td>
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<td>4 = Without</td>
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<td>Coil Voltage:</td>
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<tr>
<td>B = 24 Vdc</td>
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Refer to EV500 Sales Drawing for complete specifications.
The testing objective is to verify proper relay function for a given number of consecutive and cumulative cycles under both normal and abnormal conditions in a variety of load switching applications. The life rating of 40K cycles minimum was calculated with 95% Weibull reliability.

### Electrical Data
(Over Temperature Range — Max. Terminal Temp. = 200°C)

- **Make/Break Life for Capacitive & Resistive Loads at 320 Vdc**: 1.2 —
  - @ 90% Capacitive Pre-Charge — 50,000 cycles
  - @ 70% Capacitive Pre-Charge — 50 cycles
  - @ -250 A (2 Consecutive, Reverse Polarity) 1 — 10 cycles
  - @ 3300 A (Break only, 2 Consecutive) 1 — 4 cycles
  - Mechanical Life — 100,000 cycles

### Notes:
1. Resistive load includes inductance L = 25 µH.
2. Testing is limited at this time.

Consult Tyco Electronics for official ratings.
Product Facts
- 500 A carry, 1300 A make overload, 3000 A break overload, @ 320 Vdc
- Hydrogen dielectric for power switching high current loads
- Auxiliary contacts
- Coil power economizing — 8 W holding
- Versatile power, voltage, and current operating range
- Excellent for safety disconnect and transfer switch applications
- Suited for circuit protection and control
- Bi-directional power switching
- Hermetically-sealed contacts; can operate in harsh environments
- Fast operate and release time
- Low power consumption

Product Specifications

<table>
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<tr>
<th>Contact Arrangement</th>
<th>Form X — SPST-NO</th>
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<tbody>
<tr>
<td>Auxiliary Contact (28 Vdc, 0.1 A)</td>
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<tr>
<td>Rated Resistive Load @ 320 Vdc</td>
<td>300 Amps @ 965°C</td>
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<tr>
<td>Continuous Current Carry, Max. @ 50°C</td>
<td>500 A</td>
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<td>Overload Current @ 320 Vdc</td>
<td>Make — 1,300 A</td>
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<td></td>
<td>Break — 3,300 A</td>
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<td>Load Life, @ 320 Vdc, Min.</td>
<td>— See chart at right</td>
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<tr>
<td>Contact Resistance, Max.</td>
<td>— End of Life — 0.0002 ohm</td>
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<tr>
<td>Dielectric at Sea Level</td>
<td>— Power Terminals to Coil and All Other Points — 1,800 Vrms</td>
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<tr>
<td>Shock, 11ms, 1/2 Sine (Peak)</td>
<td>— 30 g</td>
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<tr>
<td>Vibration, Sinusoidal (55-2000 Hz, Peak)</td>
<td>— 5 g</td>
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<td>Operate Ambient Temperature Range</td>
<td>— -40°C to +85°C</td>
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<td>Operate Time, Including Bounce, Max.</td>
<td>— 25°C — 40 ms</td>
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<td>Release Time, Max.</td>
<td>— 20 ms</td>
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<td>Bounce Time, Max.</td>
<td>— 5 ms</td>
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<td>Insulation Resistance @ 500 Vdc, Min.</td>
<td>— Initial — 100 mohm</td>
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<td>End of Life — 50 mohm</td>
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Coil Data

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<th>Volts, Nominal</th>
<th>12 V</th>
<th>24 V</th>
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<tr>
<td>Pickup, Max. @ 65°C</td>
<td>9.9 Vdc</td>
<td>19.7 Vdc</td>
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<td>Hold, Max. @ 65°C</td>
<td>8.5 Vdc</td>
<td>17 Vdc</td>
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<td>Dropout, Min. @ -35°C</td>
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<td>During Pickup (300 ms)</td>
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<td>While Holding</td>
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<td>Energy, Magnetic, Max.***</td>
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**Two coils are employed for power economizing subsequent to pickup. During pickup both coils operate in parallel drawing 43 Watts momentarily. After pickup, the electronic economizing system leaves only the holding coil on, drawing 8 Watts @ 25°C. Economizing system includes transient voltage suppression.***

**Coil energy absorbed internally -4x nominal voltage.

Contact Rating Notes:
1. Maximum continuous current carry = 500 A @ 25°C = T4, derate 5A/°C for higher temp.
2. Maximum interrupt power (break only) = 1 MW @ 200mH inductance.

Electrical Life Cycles vs Power Switching

*Failure Mode: Dielectric withstand voltage test @ 2000 Vdc, power terminal to terminal, leakage exceeds 1.0 mA. Current carry: 500 A @ 25°C. Derate 2.5 A/°C to 350 A @ 85°C for still air, no heat sink, AWG# 00 conductor.

Ordering Information

Sample Part Number ▶

Series:
- **Contact Form:** X = SPST-NO, Double Make

Coil Voltage:
- A = 12 Vdc, Stud Terminals
- B = 24 Vdc, Stud Terminals

Power Terminals:
- 5 = Stud Terminals

Mounting:
- 7 = Panel Mount, Captive Bolts
## High Voltage Relays Quick Reference Guide

<table>
<thead>
<tr>
<th>Contact Voltage Vdc</th>
<th>Isolation Voltage Vdc</th>
<th>Carry Current (Amps DC)</th>
<th>Power Switching</th>
<th>RF Ratings</th>
<th>Contact Form</th>
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*Consult factory for load switching level.

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
<table>
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<tr>
<th>Contact Voltage Vdc</th>
<th>Isolation Voltage Vdc</th>
<th>Carry Current (Amps DC)</th>
<th>Power Switching</th>
<th>RF Ratings</th>
<th>Contact Form</th>
<th>Part Number Series</th>
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<td>KC-25</td>
</tr>
<tr>
<td>70 kV</td>
<td>70000</td>
<td>10</td>
<td>Make Only</td>
<td>No</td>
<td>SPST-NO</td>
<td>K70A</td>
</tr>
<tr>
<td></td>
<td>70000</td>
<td>10</td>
<td>Make Only</td>
<td>No</td>
<td>SPST-NC</td>
<td>K70B</td>
</tr>
<tr>
<td></td>
<td>70000</td>
<td>10</td>
<td>Make Only</td>
<td>No</td>
<td>SPDT</td>
<td>K70C</td>
</tr>
</tbody>
</table>

*Consult factory for load switching level.*

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
Product Facts

- AP5 make and break 5 A; AP10 make and break 10 A @ 270 Vdc
- 20 A overload rating
- Latching actuator available for low power consumption
- Ideal for applications from 28 to 1000 Vdc
- Small size and weight
- Wide variety of mounting styles (see pages 54 and 55)
- No heat sinks required
- 2000 V isolation across open contacts
- Vacuum-sealed contacts; can operate in harsh environments
- Qualified to SAE ARD 50031
- Space-rated version built in accordance with customers SCD

AP5/AP10 Relays

AP5A, AP5B, & AP5C Relays — 5 Amps

Product Specifications

<table>
<thead>
<tr>
<th>Contact Arrangement</th>
<th>Contact Form</th>
<th>Rated Resistant Load @ 270 Vdc</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP5A — SPST-NO</td>
<td>AP5A — A</td>
<td>5 A*</td>
</tr>
<tr>
<td>AP5B — SPST-NC</td>
<td>AP5B — B</td>
<td></td>
</tr>
<tr>
<td>AP5C — SPDT</td>
<td>AP5C — C</td>
<td></td>
</tr>
</tbody>
</table>

Continuous Current Carry, Max.:

- AP5A, AP5B, AP5C — 25 A**

Overload @ 270 Vdc —

- AP5A, AP5B — 20 A
- AP5C — 10 A

Contact Resistance, Max. —

- AP5A, AP5B — 10 mohm
- AP5C — 10 mohm

Dielectric at Sea Level —

Coil to Case — 500 Vrms
All Other Points — 2,000 Vrms

Shock, 11ms, 1/2 Sine (Peak) —

- AP5A, AP5B, AP5C — 50 g

Vibration, Sinusoidal (55-2000 Hz, Peak) — 10 g

Operating Ambient Temperature Range —

- -55°C to +85°C

Load Life @ 270 Vdc, Min. —

- AP5A, AP5B — 50,000 cycles
- AP5C — 10,000 cycles

Operate Time, Excluding Bounce, Max. —

- AP5A, AP5B, AP5C — 7 ms
- AP10P — 4 ms

Release Time, Max. —

- AP5A, AP5B — 10 ms
- AP10P — N/A

Bounce Time, Max. —

- AP5A, AP5B — 10 ms
- AP10P — N/A

Insulation Resistance @ 500 Vdc, Min. —

- Initial — 100 mohm
- End of Life — 50 mohm

Weight, Nominal —

- 28 gram (1 oz.)

Notes:

- *The load terminals should always be connected as follows: Common Contact +; Other Contact –.
- **10 amps for PC board connection.

AP10A, AP10B, AP10P & AP11A Relays — 10 Amps

Product Specifications

<table>
<thead>
<tr>
<th>Contact Arrangement</th>
<th>Contact Form</th>
<th>Rated Resistant Load @ 270 Vdc</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP10A — SPST-NO</td>
<td>AP10A — A</td>
<td>10 A*</td>
</tr>
<tr>
<td>AP10B — SPST-NC</td>
<td>AP10B — B</td>
<td></td>
</tr>
<tr>
<td>AP10P — SPST Latching</td>
<td>AP10P — P</td>
<td></td>
</tr>
</tbody>
</table>

Continuous Current Carry, Max. —

- AP10A, AP10B — 25 A**
- AP10P — 30 A**

Overload @ 270 Vdc — 20 A

Contact Resistance, Max. — 10 mohm

Dielectric at Sea Level —

Coil to Case — 500 Vrms
All Other Points — 2,000 Vrms

Shock, 11ms, 1/2 Sine (Peak) — 50 g

Vibration, Sinusoidal (55-2000 Hz, Peak) — 10 g

Operating Ambient Temperature Range —

- -55°C to +85°C

Load Life @ 270 Vdc, Min. —

- AP10A — 10,000 cycles
- AP10B — 7,000 cycles
- AP10P — 4 ms

Operate Time, Excluding Bounce, Max. —

- AP10A, AP10B — 7 ms
- AP10P — 4 ms

Release Time, Max. —

- AP10A, AP10B — 10 ms
- AP10P — N/A

Bounce Time, Max. —

- AP10A, AP10B — 10 ms
- AP10P — N/A

Insulation Resistance @ 500 Vdc, Min. —

- Initial — 100 mohm
- End of Life — 50 mohm

Weight, Nominal —

- 28 gram (1 oz.)

Notes:

- 1. Value for AP5C is 24 for 28 Vdc coil & 100 for 120 Vdc coil
- 2. Latching

Coil Data

<table>
<thead>
<tr>
<th>Volts, Nominal</th>
<th>12</th>
<th>28</th>
<th>28</th>
<th>120</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max.</td>
<td>10 Vdc</td>
<td>20 Vdc</td>
<td>16 Vdc</td>
<td>85 Vdc</td>
</tr>
<tr>
<td>-3.6 Vdc</td>
<td>7-12 Vdc</td>
<td>N/A</td>
<td>5-55 Vdc</td>
<td></td>
</tr>
<tr>
<td>Coils Resistance (±10%)</td>
<td>53 Ω</td>
<td>290 Ω</td>
<td>80 Ω</td>
<td>4700 Ω</td>
</tr>
</tbody>
</table>

Coil resistance rated at 25°C

Notes:

- 1. For AP5C is 24 for 28 Vdc coil & 100 for 120 Vdc coil
- 2. Latching

Ordering Information

Sample Part Number

<table>
<thead>
<tr>
<th>Series</th>
<th>AP5</th>
<th>C</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

Contact Form:

- A = SPST-NO
- B = SPST-NC
- C = SPDT
- P = SPST Latching

Coil Voltage:

- 2 = 12Vdc, Bus Wire/PC Board
- 3 = 28 Vdc, Bus Wire/PC Board
- 5 = 120 Vdc, Bus Wire/PC Board
- 7 = 12 Vdc, Turret Terminals
- 8 = 28 Vdc, Turret Terminals
- 9 = 120 Vdc, Turret Terminals
- A = 12 Vdc, Stud Terminals, Panel Mount
- B = 28 Vdc, Stud Terminals, Panel Mount
- C = 120 Vdc, Stud Terminals, Panel Mount

Power Terminals:

- 3 = Solder Connection/PC Board
- 4 = Flying Leads
- 5 = Stud Terminals, Panel Mount

Mounting:

- 2 = Flanged Mount
- 4 = Through Chassis Mount
- 5 = PCB Mount
- 7 = Panel Mount

Notes:

- *The load terminals should always be connected as follows: Common Contact +; Other Contact –.
- **10 amps for PC board connection.
KILOVAC 270+ Vdc High Voltage Relays

AP5/AP10 Relays (Continued)

Through chassis style mounting with solder type power terminals and turret coil terminals (Available in forms A, B, & C)

Through chassis style mounting with solder type power terminals and bus wire coil leads (Available in forms A, B, C, P)

Flanged style mounting with solder type power terminals and turret coil terminals (Available in forms A, B, & C)

Flanged style mounting with solder type power terminals and bus wire coil leads (Available in forms A, B, C, P)

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
PC board style mounting with PC board terminals (Available in forms A, B, & C)

Panel style mounting with flying power leads and stud terminals (Available in forms A & B)

Panel style mounting with stud terminals (Available in forms A & B)

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
KILOVAC 270+ Vdc High Voltage Relays

**AP44P — 15 Amps**

**Product Facts**
- 15 A make and break @ 270 Vdc
- 45 A carry
- 60 A overload rating
- Ideal for high voltage applications from 28 to 270 Vdc
- Latching actuator for low power consumption
- 2000 V isolation across open contacts
- Small size and weight
- Space-rated version built in accordance with customers SCD
- Meets many requirements of MIL-PRF-32085

**Product Specifications**
- Contact Arrangement: SPST Latching
- Contact Form: P
- Rated Resistive Load @ 270 Vdc — 15 A*
- Continuous Current Carry, Max. — 45 A
- Overload @ 270 Vdc — 60 A
- Contact Resistance, Max. — 10 mohm
- Dielectric at Sea Level — Coil to Case — 500 Vrms
- Operating Ambient Temperature Range — -55°C to +85°C
- Load Life @ 270 Vdc, Min. — 5,000 cycles
- Operate Time, Excluding Bounce, Max. — 2 ms
- Release Time, Max. — N/A
- Bounce Time, Max. — 3 ms
- Insulation Resistance @ 500 Vdc, Min. — Initial — 100 mohm
- End of Life — 50 mohm
- Weight, Nominal — 43 gram (1.5 oz.)

**Coil Data**

<table>
<thead>
<tr>
<th>AP44P</th>
<th>28 Latching</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latch, Max.</td>
<td>22 Vdc</td>
</tr>
<tr>
<td>Reset, Max.</td>
<td>22 Vdc</td>
</tr>
<tr>
<td>Coil Resistance (±10%)</td>
<td>80 Ω</td>
</tr>
</tbody>
</table>

Coil resistance rated at 25°C

**Ordering Information**

| Sample Part Number |
| Sample Part Number |
| AP44P | 3 | 3 | 4 |

Series: AP44P — 15 Amps
Contact Form: P = SPST Latching
Coil Voltage: 3 = 28 Vdc, Bus Wire
Power Terminals: 3 = Solder Connection
Mounting: 4 = Standard

---

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
**Product Facts**
- Vacuum dielectric for power switching
- Excellent for control applications
- PCB and panel mountings
- Rugged design for the most demanding applications, including seismic shock
- Small size and weight
- Low power consumption
- No heat sinks required
- Vacuum-sealed; can operate in explosive and harsh environments
- 2000 V isolation across open contacts

**Product Specifications**
- **Contact Arrangement** —
  - PD5A — SPST-NO
  - PD5B — SPST-NC
- **Contact Form** —
  - PD5A — A**
  - PD5B — B**
- **Rated Resistive Load @ 320 Vdc** —
  - 5 A
- **Continuous Current Carry, Max. @ 85°C** — 15 A
- **Overload @ 320 Vdc, (Make/Break)** — 20 A
- **Life, (Mechanical/Rated Load)** —
  - 500 cycles/50k cycles
- **Contact Resistance, Max., End of Life** — 0.010 ohm
- **Dielectric at Sea Level** —
  - Power Terminals to Coil and All Other Points — 1,800 Vrms
- **Shock, 11ms, 1/2 Sine (Peak)** — 25 g
- **Vibration, Sinusoidal (55-2000 Hz, Peak)** — 5 g
- **Operating Ambient Temperature Range** —
  - -40°C to +85°C
- **Operate Time, Max., Including Bounce @ 25°C** — 10 ms
- **Release Time, Max., Including Bounce @ 25°C** — 10 ms
- **Insulation Resistance @ 500 Vdc, Min.** —
  - Initial/End of Life — 100 mohm/50 mohm
- **Weight, Nominal** —
  - 57 g (.125 lb)

**Contact Ratings**
- Based on extrapolated data. Since each application is unique, user is encouraged to verify rating in actual application. The load terminals should always be connected as follows: Common Contact (A2) positive; Other Contact negative.

**Coil Data**
- **Nominal Volts DC**
  - 12 Vdc
  - 24 Vdc
  - 125 Vdc
- **Max. Coil Voltage**
  - 14 Vdc
  - 28 Vdc
  - 130 Vdc
- **Pickup, Max. @ 85°C**
  - 8 Vdc
  - 16 Vdc
  - 80 Vdc
- **Hold, Min. @ 85°C**
  - 3.3 Vdc
  - 10 Vdc
  - 33 Vdc
- **Dropout, Min. @ -40°C**
  - .5 Vdc
  - 1 Vdc
  - 5 Vdc
- **Coil Resistance (±10%)**
  - 70 Ω
  - 290 Ω
  - 4700 Ω

**Ordering Information**
- **Sample Part Number**
- **Series:**
  - **Contact Form:**
    - A = SPST-NO
    - B = SPST-NC
    - C = SPDT (PCB Only)
  - **Coil Voltage:**
    - 2 = 12 Vdc, PCB Version
    - 3 = 24 Vdc, PCB Version
    - 5 = 125 Vdc, PCB Version
    - A = 12 Vdc, Panel Mount Version
    - B = 24 Vdc, Panel Mount Version
    - C = 125 Vdc, Panel Mount Version
  - **Power Terminals:**
    - 3 = PCB Solder Connection
    - 5 = Stud Terminal, Panel Mount
  - **Mounting:**
    - 7 = Panel Mount

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
# PD10 Make & Break Load Switching

**Product Facts**
- Excellent for control applications
- PCB and panel mountings
- Rugged design for the most demanding applications, including seismic shock
- Small size and weight
- Low power consumption
- No heat sinks required
- Vacuum-sealed; can operate in explosive and harsh environments
- 2000 V isolation across open contacts
- Vacuum dielectric for power switching

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.

**Contact Ratings**

<table>
<thead>
<tr>
<th>Contact Current, Max. @ 85°C</th>
<th>PD10A and PD10B</th>
<th>25 A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Resistance, End of Life</td>
<td>PD10A and PD10B</td>
<td>0.010 ohm</td>
</tr>
<tr>
<td>Life, (Mechanical/Rated Load)</td>
<td>PD10A and PD10B</td>
<td>500k cycles/10k cycles</td>
</tr>
<tr>
<td>Rated Resistive Load</td>
<td>PD10P***</td>
<td>7,000 cycles</td>
</tr>
<tr>
<td>Release Time, Max., Including Bounce @ 25°C</td>
<td>PD10A and PD10B</td>
<td>10 ms</td>
</tr>
<tr>
<td>Overload @ 320 Vdc</td>
<td>PD10A and PD10B</td>
<td>20 A</td>
</tr>
<tr>
<td>Shock, 11ms, 1/2 Sine (Peak)</td>
<td>PD10P***</td>
<td>2,000 Vrms</td>
</tr>
<tr>
<td>Continuous Current Carry</td>
<td>PD10A and PD10B</td>
<td>10 A</td>
</tr>
<tr>
<td>Temperature Range</td>
<td>PD10A and PD10B</td>
<td>-40°C to +85°C</td>
</tr>
<tr>
<td>Vibration, Sinusoidal</td>
<td>55-2000 Hz, Peak</td>
<td></td>
</tr>
<tr>
<td>Dielectric at Sea Level</td>
<td>PD10A and PD10B</td>
<td>1,800 Vrms</td>
</tr>
<tr>
<td>Weight, Nominal</td>
<td>PD10P***</td>
<td>71 g (.156lb)</td>
</tr>
<tr>
<td>Insulation Resistance @ 500 Vdc, Min.</td>
<td>PD10A and PD10B</td>
<td>100 mohm/50 mohm</td>
</tr>
</tbody>
</table>

Notes:
- **Contact Tyco Electronics for availability of other contact forms**
- ***Not available in package shown, package is the same as the K41P.

**Ordering Information**

- Sample Part Number: PD10 AA5 7
- Series:
  - Contact Form:
    - A = SPST-NO
    - B = SPST-NC
    - P = SPST-Latching
  - Coil Voltage:
    - 2 = 12 Vdc, PCB Version
    - 3 = 24 Vdc, PCB Version
    - 5 = 125 Vdc, PCB Version
    - A = 12 Vdc, Panel Mount Version
    - B = 24 Vdc, Panel Mount Version
    - C = 125 Vdc, Panel Mount Version
  - Power Terminals:
    - 3 = PCB Solder Connection
    - 5 = Stud Terminal, Panel Mount
  - Mounting:
    - 5 = PCB Mount
    - 7 = Panel Mount

**Product Specifications**

- **Contact Arrangement**
  - PD10A — SPST-NO
  - PD10B — SPST-NC
  - PD10P*** — SPST-Latching
- **Contact Form**
  - PD10A — A**
  - PD10B — B**
  - PD10P*** — P**
- **Rated Resistive Load @ 320 Vdc**
  - 10 A
- **Continuous Current Carry, Max. @ 85°C**
  - PD10A and PD10B — 25 A
  - PD10P*** — 30 A
- **Overload @ 320 Vdc, (Make/Break) — 20 A**

**Ratings listed are for 25°C, sea level conditions**

## Coil Data

<table>
<thead>
<tr>
<th>Nominal Volts DC</th>
<th>12 Vdc</th>
<th>24 Vdc</th>
<th>125 Vdc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Coil Voltage</td>
<td>14 Vdc</td>
<td>28 Vdc</td>
<td>130 Vdc</td>
</tr>
<tr>
<td>Pickup, Max. @ 85°C</td>
<td>8 Vdc</td>
<td>16 Vdc</td>
<td>80 Vdc</td>
</tr>
<tr>
<td>Hold, Min. @ 85°C</td>
<td>3.3 Vdc</td>
<td>10 Vdc</td>
<td>33 Vdc</td>
</tr>
<tr>
<td>Dropout, Min. @ -40°C</td>
<td>5 Vdc</td>
<td>1 Vdc</td>
<td>5 Vdc</td>
</tr>
<tr>
<td>Coil Resistance (±10%)</td>
<td>70 Ω</td>
<td>290 Ω</td>
<td>4700 Ω</td>
</tr>
</tbody>
</table>

**Notes:** Based on extrapolated data. Since each application is unique, user is encouraged to verify rating in actual application. The load terminals should always be connected as follows: Common Contact (A2) positive; Other Contact negative.
S06CBA335

Product Facts
- Small size, high performance relays
- Vacuum dielectric for low leakage current applications
- RF ratings to 30 MHz
- SPST normally open contacts

Product Specifications
- Contact Arrangement: SPST-NO
- Contact Form: A
- Voltage Ratings (Peak):
  - Between Contacts: 2 kV
  - Contacts to Coil: 2 kV
  - Contacts to Screen: 2 kV
  - Coil to Screen: 5 kV
- Carry Current, Max.:
  - @ DC: 6 A
  - @ 30 MHz: 6 A
- Contact Resistance: 0.025 mohm
- Contact Capacitance:
  - Between Open Contacts: 0.3 pF
  - Closed Contacts to Ground: 6 pF
- Operate Time: 2 ms
- Release Time: 0.5 ms
- Shock, 11 ms, 1/2 Sine (Peak): 100 g
- Vibration:
  - Peak: 30 g (10 to 2000 Hz)
- Operating Temperature Range:
  - -20°C to +70°C
- Storage Temperature Range:
  - -35°C to +110°C
- Insulation Resistance:
  - Initial: 10 gigahms
  - Mechanical Life: 100 million cycles
- Weight, Nominal: 6.8 g (0.24 oz.)

Coil Data
- Volts, Nominal: 24 Vdc
- Maximum Voltage: 30 Vdc
- Pickup, Max.: 18 Vdc
- Dropout, Max.: 4 Vdc
- Coil Resistance: 1000 Ω
- RF Screen, Inner: Pin # S1
- RF Screen, Outer: N/A
- EM Shield: N/A

Notes:
1. Dimensions in parentheses are in millimeters.
2. Pin dimension tolerances are as follows:
   - Lengths: ± .04 (1.0)
   - Spacing: ± .006 (.15)
3. Pins A1 and A2 are .028 (.71); pins S1, X1 and X2 are .025 (.63) square
4. Operate and release times are with external diode suppressions, @ 25°C.

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
KILOVAC High Voltage Relays

K45 Series Make & Break Load Switching — 1.5 - 2 kV Relays

K45C

Product Facts

- Small, low profile 2 kV relay
- Vacuum dielectric for power switching low current loads
- Single pole, double throw contacts
- Widely used in H.F. communication equipment
- Meets requirements of MIL-R-83725
- Low power consumption

Product Specifications

<table>
<thead>
<tr>
<th>Contact Arrangement —</th>
<th>SPDT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Form — C —</td>
<td></td>
</tr>
<tr>
<td>Test Voltage, DC or 60 Hz (Peak) —</td>
<td>4 kV</td>
</tr>
<tr>
<td>Rated Operating Voltage (Peak) —</td>
<td>DC or 60 Hz — 2 kV</td>
</tr>
<tr>
<td></td>
<td>2.5 MHz — 1.8 kV</td>
</tr>
<tr>
<td></td>
<td>16 MHz — 1.4 kV</td>
</tr>
<tr>
<td></td>
<td>32 MHz — 1.1 kV</td>
</tr>
<tr>
<td>Continuous Carry Current, Max. —</td>
<td>DC or 60 Hz — 20 A</td>
</tr>
<tr>
<td></td>
<td>2.5 MHz — 16 A</td>
</tr>
<tr>
<td></td>
<td>16 MHz — 10 A</td>
</tr>
<tr>
<td></td>
<td>32 MHz — 6 A</td>
</tr>
<tr>
<td>Coil Hi-Pot (Vrms, 60 Hz) —</td>
<td>500 A</td>
</tr>
<tr>
<td>Contact Capacitance —</td>
<td>Between Open Contacts — 1.6 pF</td>
</tr>
<tr>
<td></td>
<td>Open Contacts to Ground — 2 pF</td>
</tr>
<tr>
<td>Contact Resistance, Max. —</td>
<td>0.05 ohm</td>
</tr>
<tr>
<td>Operate Time, Max. —</td>
<td>10 ms</td>
</tr>
<tr>
<td>Release Time, Max. —</td>
<td>10 ms</td>
</tr>
<tr>
<td>Shock, 11ms, 1/2 Sine (Peak) —</td>
<td>30 g</td>
</tr>
<tr>
<td>Vibration — Peak —</td>
<td>10 g (10 to 2000 Hz)</td>
</tr>
<tr>
<td>Operating Ambient Temperature Range —</td>
<td>-55°C to +125°C</td>
</tr>
<tr>
<td>Mechanical Life —</td>
<td>2 million cycles</td>
</tr>
<tr>
<td>Weight, Nominal —</td>
<td>21.26 g (0.75 oz.)</td>
</tr>
</tbody>
</table>

Coil Data

<table>
<thead>
<tr>
<th>Volts, Nominal DC</th>
<th>12 V</th>
<th>26.5 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max. —</td>
<td>8 Vdc</td>
<td>16 Vdc</td>
</tr>
<tr>
<td>Hold, Max. @ 65°C —</td>
<td>8.5 Vdc</td>
<td>17 Vdc</td>
</tr>
<tr>
<td>Dropout —</td>
<td>5-5 Vdc</td>
<td>1-10 Vdc</td>
</tr>
<tr>
<td>Coil Resistance (±10%) —</td>
<td>230 Ω</td>
<td>920 Ω</td>
</tr>
</tbody>
</table>

Ordering Information

Sample Part Number ▶

<table>
<thead>
<tr>
<th>Series:</th>
<th>K45</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Form:</td>
<td>C = SPDT</td>
</tr>
<tr>
<td>Coil Voltage:</td>
<td>2 = 12 Vdc, Bus Wire</td>
</tr>
<tr>
<td></td>
<td>3 = 26.5 Vdc, Bus Wire</td>
</tr>
<tr>
<td>High Voltage Connections:</td>
<td>3 = Solder Connection</td>
</tr>
<tr>
<td>Mounting:</td>
<td>2 = Flanged</td>
</tr>
<tr>
<td></td>
<td>4 = Standard</td>
</tr>
</tbody>
</table>

See page 7-97 for mounting methods.
S02DN

Product Facts
■ PC mount form A relay
■ Vacuum dielectric for low leakage current applications
■ 100 million cycle mechanical life
■ 2 amp continuous carry
■ Very compact package

Product Specifications

Contact Arrangement — SPST-NO
Contact Form — A
Voltage Ratings Between Contacts (Peak) — 3 kV
Current Carry, @ DC — 2 A
Contact Resistance — 0.100 ohm
Contact Capacitance —
  - Between Open Contacts — 1.5 pF
  - Closed Contacts to Ground — 6 pF
Operate and Release Time — 1 ms
Shock, 11ms, 1/2 Sine (Peak) — 100 g

Vibration
  - Peak — 30 g (10 to 2000 Hz)
  - Operating Temperature Range — -20°C to +70°C
  - Storage Temperature Range — -35°C to +110°C
Insulation Resistance
  - Initial — 10 gigaohms
  - Mechanical Life — 100 million cycles
Weight, Nominal — 5.1 g (0.18 oz.)

Coil Data

<table>
<thead>
<tr>
<th>Volts, Nominal DC</th>
<th>5 V</th>
<th>12 V</th>
<th>24 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max.</td>
<td>3.7 Vdc</td>
<td>9 Vdc</td>
<td>20 Vdc</td>
</tr>
<tr>
<td>Dropout</td>
<td>0.5 Vdc</td>
<td>1.25 Vdc</td>
<td>3 Vdc</td>
</tr>
<tr>
<td>Coil Resistance (±10%)</td>
<td>140 Ω</td>
<td>600 Ω</td>
<td>1,000 Ω</td>
</tr>
</tbody>
</table>

Coil Voltage:
1 = 5 Vdc 2 = 12 Vdc 3 = 24 Vdc

High Voltage Connections:
3 = Solder Connection

Ordering Information

Sample Part Number
S02DN A 3 3 5

Series:
Contact Form:
A = SPST-NO

Mounting:
5 = PC Mount

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
HC Series — 3.5 kV Relays

HC-1
No Load Switching

HC-3
Make & Break Load Switching

Product Facts for HC-1
- Widely used for RF applications
- Vacuum dielectric for low leakage current applications
- Copper contacts for high current capability
- Not designed for power switching
- Meets requirements of MIL-R-83725
- QPL version available, M83725/5-001

HC-5
Make Only Load Switching

Product Facts for HC-5
- Gas-filled for “make only” power switching
- SF-6 gas-filled for capacitive discharge applications
- Tungsten contacts for long life when power switching

Product Specifications for HC-1, HC-3 and HC-5

Contact Arrangement — SPDT

Contact Form — C

Test Voltage, DC or 60 Hz (Peak) — 5 kV

Rated Operating Voltage (Peak) —
DC or 60 Hz — 3.5 kV
2.5 MHz — 21 kV
16 MHz — 2 kV
32 MHz — 1.5 kV

Continuous Carry Current, Max. —
DC or 60 Hz — HC-1 — 25 A
HC-3 — 18 A
HC-5 — 8 A
2.5 MHz — HC-1 — 14 A
16 MHz — HC-1 — 9 A
32 MHz — HC-1 — 7 A

Coil Hi-Pot (Vrms, 60 Hz) — 500 A

Contact Capacitance —
Between Open Contacts — HC-1 — 2 pF

Open Contacts to Ground —
HC-1 — 2.5 pF

Contact Resistance, Max. —
HC-1 — 0.01 ohm
HC-3 — 0.02 ohm
HC-5 — 0.50 ohm*

Operate Time, Max. — 6 ms

Release Time, Max. — 6 ms

Shock, 11ms, 1/2 Sine (Peak) — 50 g

Vibration —
Peak — 10 g (55 to 2000 Hz)

Operating Ambient Temperature Range — -55°C to +125°C

Mechanical Life —
HC-1, HC-3 — 2 million cycles
HC-5 — 1 million cycles

Weight, Nominal —
28.35 g (1.0 oz.)

Note:
*Contact resistance for gas-filled relays is measured at 28 Vdc, 1 Amp

Coil Data

<table>
<thead>
<tr>
<th>Nominal Volts DC</th>
<th>12 Vdc</th>
<th>26.5 Vdc</th>
<th>115 Vdc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max.</td>
<td>8 Vdc</td>
<td>16 Vdc</td>
<td>80 Vdc</td>
</tr>
<tr>
<td>Dropout</td>
<td>0.5-5 Vdc</td>
<td>1-10 Vdc</td>
<td>5-50 Vdc</td>
</tr>
<tr>
<td>Coil Resistance (±10%)</td>
<td>80 Ω</td>
<td>335 Ω</td>
<td>6000 Ω</td>
</tr>
</tbody>
</table>

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.

Ordering Information

Sample Part Number —
HC-1 /12Vdc

Series:
1
3
5

Coil Voltage:
Blank = 26.5 Vdc
/12Vdc = 12 Vdc
/115Vdc = 115 Vdc
KILOVAC High Voltage Relays

S06 Series No Load Switching — 5.0 kV Relays

S06FNA218

Product Facts
- 8 Amp carry at DC;
- 6 Amp carry at 30 MHz
- Vacuum dielectric for low leakage current applications
- Highly reliable RF relay
- 100 million cycle mechanical life

Product Specifications

<table>
<thead>
<tr>
<th>Contact Arrangement —</th>
<th>SPST-NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Form —</td>
<td>A</td>
</tr>
</tbody>
</table>
| Voltage Ratings (Peak) — | Between Contacts — 5 kV
| Contacts to Coil — 5 kV
| Coil to Screen — N/A |
| Carry Current, Max. — | @ DC — 8 A
| @ 30 MHz — 6 A |
| Contact Resistance — | 0.050 ohm |
| Contact Capacitance — | Between Open Contacts — 0.6 pF
| Closed Contacts to Ground — 4 pF |

Operate Time 5 — 3 ms
Release Time 5 — 1 ms
Shock, 11ms, 1/2 Sine (Peak) — 100 g
Vibration —
Peak — 20 g (10 to 500 Hz)
Operating Temperature Range — -40°C to +85°C
Storage Temperature Range — -55°C to +125°C
Insulation Resistance — Initial — 10 gigaohms
Mechanical Life — 100 million cycles
Weight, Nominal — 24.1 gram (0.85 oz.)

Coil Data

- Volts, Nominal 12 Vdc
- Maximum Voltage 15 Vdc
- Pickup, Max. 8 Vdc
- Dropout, Max. 2 Vdc
- Coil Resistance 480 Ω
- RF Screen, Inner N/A
- RF Screen, Outer N/A
- EM Shield N/A

Notes:
1. Dimensions in parentheses are in millimeters.
2. Pin dimensions are .024 [.61] nom. square.
3. Recommended PCB holes: .043 [1.0]
4. RF screens are not included.
5. Operate and release times are with external diode suppression, @ 25°C.
K41A, K41B
Product Facts
- High current carry rating
- Vacuum dielectric for power switching low current loads
- Glazed ceramics for low current leakage
- Compact, space-saving design
- Meets requirements of MIL-R-83725
- QPL versions available, M83725/21 & M83725/22

K41C
Product Facts
- Single pole, double throw version
- Vacuum dielectric for power switching low current loads
- RF ratings to 32 MHz
- Long life: 2 million cycles
- Meets requirements of MIL-R-83725
- QPL version available, M83725/23

Product Specifications for K41A, K41B and K41C
Contact Arrangement —
K41A — SPST-NO
K41B — SPST-NC
K41C — SPDT
Contact Form —
K41A — A
K41B — B
K41C — C
Test Voltage, DC or 60 Hz (Peak) — 6 kV
Rated Operating Voltage (Peak) —
DC or 60 Hz — 5 kV
2.5 MHz — 4.5 kV
16 MHz — 3.5 kV
32 MHz — 2.8 kV
Continuous Carry Current, Max. —
DC or 60 Hz — 30 A
2.5 MHz — 24 A
16 MHz — 16 A
32 MHz — 12 A
Coil Hi-Pot (Vrms, 60 Hz) — 500 A
Coil Data
- Nominal Volts DC: 12 Vdc, 26.5 Vdc, 115 Vdc
- Pickup, Max.: 8 Vdc, 16 Vdc, 80 Vdc
- Dropout: 5-50 Vdc
- Coil Resistance: 70 Ω, 290 Ω, 4700 Ω

Contact Capacitance —
Between Open Contacts — 1.2 pF
Open Contacts to Ground — 1.2 pF
Contact Resistance, Max. —
0.02 ohm
Operate Time, Max. — 10 ms
Release Time, Max. — 10 ms
Shock, 11 ms, 1/2 Sine (Peak) —
50 g
Vibration —
Peak — 10 g (55 to 2000 Hz)
Operating Ambient Temperature Range — -55°C to +125°C
Mechanical Life — 2 million cycles
Weight, Nominal —
28.35 g (1.0 oz.)

Contact Capacitance —
Between Open Contacts — 1.2 pF
Open Contacts to Ground — 1.2 pF
Contact Resistance, Max. —
0.02 ohm
Operate Time, Max. — 10 ms
Release Time, Max. — 10 ms
Shock, 11 ms, 1/2 Sine (Peak) —
50 g
Vibration —
Peak — 10 g (55 to 2000 Hz)
Operating Ambient Temperature Range — -55°C to +125°C
Mechanical Life — 2 million cycles
Weight, Nominal —
28.35 g (1.0 oz.)

*See page 7-97 for turret terminal dimensions and mounting methods.

Coil Voltage:
2 = 12 Vdc, Bus Wire
3 = 26.5 Vdc, Bus Wire
5 = 115 Vdc, Bus Wire
7 = 12 Vdc, Turret Terminal*
8 = 26.5 Vdc, Turret Terminal*
9 = 115 Vdc, Turret Terminal*
High Voltage Connections:
3 = Solder Connection
2 = Flanged
4 = Standard
Mounting:

Ordering Information
Sample Part Number ►
K41 A 3 3 4

For factory-direct application assistance,
dial 800-253-4560, ext. 2055, or 805-220-2055.
K41P
Product Facts
■ Fast, 6 millisecond operate time
■ Vacuum dielectric for power switching low current loads
■ Latching actuator for low power consumption
■ Ideal for frequency agile communication systems
■ Meets requirements of MIL-R-83725
■ QPL version available, M83725/24

K41 Series Make & Break Load Switching — 5.0 kV Relays

K41R
Product Facts
■ Latching actuator for low power consumption
■ Vacuum dielectric for power switching low current loads
■ Meets requirements of MIL-R-83725
■ Latching version of K41C

Product Specifications for K41P and K41R
Contact Arrangement —
K41P — SPST-Latching
K41R — SPDT-Latching
Contact Form —
K41P — P
K41R — R
Test Voltage, DC or 60 Hz (Peak) —
6 kV
Rated Operating Voltage (Peak) —
DC or 60 Hz — 5 kV
2.5 MHz — K41P — 4.5 kV
K41R — 4.0 kV
16 MHz — K41P — 3.5 kV
K41R — 3.2 kV
32 MHz — K41P — 2.8 kV
K41R — 2.5 kV
Continuous Carry Current, Max. —
DC or 60 Hz — 30 A
2.5 MHz — K41P — 20 A
K41R — 16 A
16 MHz — K41P — 13 A
K41R — 10 A
32 MHz — K41P — 10 A
K41R — 6 A
Coil Hi-Pot (Vrms, 60 Hz) — 500 V
Contact Capacitance —
Between Open Contacts —
K41P — 1.2 pF
K41R — 1.6 pF
Open Contacts to Ground —
K41P — 1.2 pF
K41R — 1.6 pF
Contact Resistance, Max. —
0.02 ohm
Operate Time, Max. — 6 ms
Release Time, Max. — N/A
Shock, 11 ms, 1/2 Sine (Peak) —
K41P — 50 g
K41R — 30 g
Vibration
Peak — 10 g (55 to 2000 Hz)
Operating Ambient Temperature Range — -55°C to +125°C
Insulation Resistance —
Initial — 10 gigaohms
Mechanical Life — 1 million cycles
Weight, Nominal — 28.35 g (1.0 oz.)
Coil Data
Volts, Nominal 26.5 Vdc
Reset & Latch, Max. 16 Vdc
Dropout N/A
Coil Resistance (±10%) 80 Ω
Ratings listed are for 25°C, sea level conditions.

Ordering Information
Sample Part Number

Series:
Contact Form:
P = SPST-Latching
R = SPDT-Latching
Coil Voltage:
3 = 26.5 Vdc, Bus Wire
High Voltage Connections:
3 = Solder Connection
Mounting:* 2 = Flanged
4 = Standard

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.

*See page 7-97 for mounting methods.
KILOVAC High Voltage Relays

Product Facts for K40P
- Vacuum dielectric for power switching low current loads
- Fast, 1 millisecond operate time
- Long life: 10 million cycles
- 35 Amps continuous current rating at DC; 8 Amps at 32 MHz
- Ideal for high power antenna couplers
- Meets requirements of MIL-R-83725

Product Facts for K40P364
- Double sided terminals for ease of connection to bus bar
- Vacuum dielectric for power switching low current loads
- Fast switching, high current capabilities
- Small and lightweight

Product Specifications
Contact Arrangement — SPST-Latching
Contact Form — P
Test Voltage, DC or 60 Hz (Peak) — 6 kV
Rated Operating Voltage (Peak) —
    DC or 60 Hz — 5 kV
    2.5 MHz — 4.5 kV
    16 MHz — 3.5 kV
    32 MHz — 2.8 kV
Continuous Carry Current, Max. —
    DC or 60 Hz — 35 A
    2.5 MHz — 21 A
    16 MHz — 14 A
    32 MHz — 8 A
Coil Hi-Pot (Vrms, 60 Hz) — 500 A

Contact Capacitance —
    Between Open Contacts — 1.2 pF
    Open Contacts to Ground — 1.2 pF
Contact Resistance, Max. — 0.02 ohm
Operate Time, Max. — 1 ms
Release Time, Max. — N/A
Shock, 11ms, 1/2 Sine (Peak) — 50 g
Vibration —
    Peak — 30 g (55 to 2000 Hz)
Operating Ambient Temperature Range — -55°C to +125°C
Mechanical Life — 10 million cycles
Weight, Nominal — 28.35 g (1.0 oz.)

Coil Data
Volts, Nominal — 26.5 Vdc
Reset & Latch, Max. — 16 Vdc
Dropout — N/A
Coil Resistance (±10%) — 80 Ω
Ratings listed are for 25°C, sea level conditions.

Ordering Information
Sample Part Number
Series:
Contact Form:
P = SPST-Latching
Coil Voltage:
3 = 26.5 Vdc, Bus Wire
High Voltage Connections:
3 = Solder Connection
6 = Double Sided Solder Connection
Mounting:* 2 = Flanged 4 = Standard

*See page 7-97 for mounting methods.

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
KILOVAC High Voltage Relays

S06 Series No Load Switching — 7.0 kV Relays

S06HBA318
Product Facts
- 8 Amp continuous carry at 7 kVdc
- Vacuum dielectric for power switching low current loads
- 100 million cycle mechanical life
- Carries 10 A at DC; 6 Amps at 30 MHz

Product Specifications
Contact Arrangement — SPST-NO
Contact Form — A
Voltage Ratings (Peak) —
Between Contacts — 7 kV
Contacts to Coil — 7 kV
Contacts to Screen — 7 kV
Coil to Screen — .5 kV
Carry Current, Max. —
@ DC — 10 A
@ 30 MHz — 6 A
Contact Resistance — 50 mohm
Contact Capacitance —
Between Open Contacts — 0.4 pF
Closed Contacts to Ground — 5 pF
Operate Time 4 — 2 ms
Release Time 4 — 1 ms
Shock, 11ms, 1/2 Sine (Peak) —
100 g
Vibration —
Peak — 20 g (10 to 500 Hz)
Operating Temperature Range —
-40°C to +85°C
Storage Temperature Range —
-55°C to +125°C
Insulation Resistance —
Initial — 10 gigohms
Mechanical Life —
100 million cycles
Weight, Nominal —
24.1 gram (0.85 oz.)

Coil Data
Volts, Nominal — 24 Vdc
Maximum Voltage — 31 Vdc
Pickup, Max. — 15 Vdc
Dropout, Max. — 2 Vdc
Coil Resistance — 1,000 Ω
RF Screen, Inner Pin # S1
RF Screen, Outer Pin # S2
EM Shield — N/A

Notes:
1. Dimensions in parentheses are in millimeters.
2. Pin dimensions are .024 [.61] nom. square.
3. Recommended PCB holes: .043 [1.0]
4. Operate and release times are with external diode suppression, @ 25°C.

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
**KILOVAC High Voltage Relays**

**KM-17 Series Make Only Load Switching — 7.5 kV Relays**

**Product Facts**
- Double pole, double throw contacts
- SF-6 gas-filled for ideal discharge waveform
- High voltage flying leads
- Tabs for easy mount
- Widely used in defibrillator applications

**Product Specifications for KM-17**

- **Contact Arrangement** — DPDT
- **Contact Form** — 2C
- **Test Voltage, DC or 60 Hz (Peak)** — 14 kV
- **Rated Operating Voltage (Peak)** — DC or 60 Hz — 7.5 kV
- **Continuous Carry Current, Max.** — DC or 60 Hz — 10 A
  - Coil Hi-Pot (Vrms, 60 Hz) — 500 A
- **Contact Capacitance** — Between Open Contacts — N/A
  - Open Contacts to Ground — N/A
- **Contact Resistance, Max.** — 0.5 ohm*
- **Operate Time, Max.** — 20 ms
- **Release Time, Max.** — 20 ms
- **Shock, 11ms, 1/2 Sine (Peak)** — 10 g

**Vibration** —
- Peak — 10 g (55 to 500 Hz)

**Operating Ambient Temperature**
- Range — -20°C to +65°C
- Insulation Resistance — Initial — 10 gigaohms
- **Mechanical Life** — 100,000 cycle
- **Weight, Nominal** — KM-17 — 311.8 g (11 oz.)

**Ordering Information**

- **Sample Part Number**
  - **Series:**
  - **Model:**
    - 17
  - **Coil Voltage:**
    - Blank = 12 Vdc
    - /26.5Vdc = 26.5 Vdc

**Coil Data**

<table>
<thead>
<tr>
<th>Nominal Volts DC</th>
<th>12 Vdc</th>
<th>26 Vdc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max.</td>
<td>8 Vdc</td>
<td>16 Vdc</td>
</tr>
<tr>
<td>Dropout</td>
<td>.5-5 Vdc</td>
<td>1-10 Vdc</td>
</tr>
<tr>
<td><strong>Coil Resistance (±10%)</strong></td>
<td>12 Ω</td>
<td>48 Ω</td>
</tr>
</tbody>
</table>

Ratings listed are for 25°C, sea level conditions

Coils are not for continuous duty.

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.

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**Catalog 5-1773450-5**
**Revised 9-08**

[www.tycoelectronics.com](http://www.tycoelectronics.com)
KILOVAC High Voltage Relays

S06 Series No Load Switching — 8 kV Relays

**S06JNB218**

**Product Facts**
- High reliable RF relay
- Vacuum dielectric for power switching low current loads
- 100 million cycle mechanical life
- Form B relay
- 8 Amps at DC; 6 Amps at 30 MHz

**Product Specifications**

- **Contact Arrangement** — SPST-NC
- **Contact Form** — B
- **Voltage Ratings (Peak)**
  - Between Contacts — 8 kV
  - Contacts to Coil — 8 kV
- **Carry Current, Max.**
  - @ DC — 8 A
  - @ 30 MHz — 6 A
- **Contact Resistance** — 0.050 ohm
- **Contact Capacitance**
  - Between Open Contacts — 0.6 pF
  - Closed Contacts to Ground — 4 pF
- **Operate Time** — 3 ms
- **Release Time** — 2 ms
- **Shock, 11ms, 1/2 Sine (Peak)** — 100 g
- **Vibration**
  - Peak — 20 g (10 to 500 Hz)
- **Operating Temperature Range** — -40°C to +85°C
- **Storage Temperature Range** — -55°C to +125°C
- **Insulation Resistance**
  - Initial — 10 gigahms
- **Mechanical Life** — 100 million cycles
- **Weight, Nominal** — 4.54 gram (0.16 oz.)

**Coil Data**

- **Volts, Nominal** — 12 Vdc
- **Maximum Voltage** — 18 Vdc
- **Pickup, Max.** — 6 Vdc
- **Dropout, Max.** — 2 Vdc
- **Coil Resistance** — 380 Ω
- **RF Screen, Inner** — N/A
- **RF Screen, Outer** — N/A
- **EM Shield** — N/A

**Notes:**
1. Dimensions in parentheses are in millimeters.
2. Pin dimensions are .024 [.61] nom. square.
3. Recommended PCB holes: .043 [.10]
4. Coil terminals are polarity sensitive for the normally closed B version. X1 is positive, +, and X2 is negative, –.
5. Operate and release times are with external diode suppression, @ 25°C.

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.

Catalog 5-1773450-5
Revised 9-08
www.tycoelectronics.com

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.

Dimensions are shown for reference purposes only. Specifications subject to change.

USA: 1-800-522-6752
Canada: 1-905-470-4425
Mexico: 01-800-733-8926
C. America: 52-55-1106-0803
South America: 55-11-2103-6000
Hong Kong: 852-2735-1628
Japan: 81-44-844-8013
UK: 44-870-690-208
K47 Series Make & Break Load Switching — 8 kV Relays

K47A
Product Facts for K47A
- Widely used in antenna coupler applications
- Short actuator, low profile, 8 kV relay
- Vacuum dielectric for power switching low current loads
- Normally open contacts
- Meets requirements of MIL-R-83725

Product Specifications for K47A and K47B

<table>
<thead>
<tr>
<th>Contact Arrangement</th>
<th>K47A — SPST-NO</th>
<th>K47B — SPST-NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Form</td>
<td>K47A — A</td>
<td>K47B — B</td>
</tr>
<tr>
<td>Test Voltage, DC or 60 Hz (Peak)</td>
<td>9 kV</td>
<td>60 Hz — 8 kV</td>
</tr>
<tr>
<td>Rated Operating Voltage (Peak)</td>
<td>DC or 60 Hz — 8 kV</td>
<td></td>
</tr>
<tr>
<td>2.5 MHz — 7.5 kV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 MHz — 7 kV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32 MHz — 5 kV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous Carry Current, Max.</td>
<td>DC or 60 Hz — 12 A</td>
<td></td>
</tr>
<tr>
<td>2.5 MHz — 10 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 MHz — 5 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32 MHz — 3 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coil Hi-Pot (Vrms, 60 Hz) — 500 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact Capacitance</td>
<td>Between Open Contacts — 1.2 pF</td>
<td></td>
</tr>
<tr>
<td>Open Contacts to Ground — 1.2 pF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Coil Data
- Nominal Volts DC: 12 Vdc, 26.5 Vdc
- Pickup, Max.: 8 Vdc, 16 Vdc
- Dropout: 5-5 Vdc, 1-10 Vdc
- Coil Resistance (±10%): 230 Ω, 707 Ω

Ordering Information

Sample Part Number | K47 A 3 3 4 |
Series: | 2 = Flanged | 4 = Standard |
Contact Form: | A = SPST-NO | B = SPST-NC |
Coil Voltage: | 2 = 12 Vdc, Bus Wire |
| 3 = 26.5 Vdc, Bus Wire |
High Voltage Connections: | 3 = Solder Connection |
Mounting: | 2 = Flanged | 4 = Standard |

*See page 7-97 for mounting methods.

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
HC Series — 8 kV Relays

**HC-2**
No Load Switching

**HC-4**
Make & Break Load Switching

**Product Facts for HC-2**
- Vacuum dielectric and copper contacts for high current carry rating of 25 Amps
- Not designed for power switching
- Stable, low contact resistance
- Meets requirements of MIL-R-83725

**HC-6**
Make Only Load Switching

**Product Facts for HC-6**
- Tungsten contacts for switching high in-rush loads
- SF-6 gas-filled for capacitive discharge applications
- Suitable for ESD testing applications
- Tungsten contacts for long life in power switching applications

**Product Specifications for HC-2, HC-4 and HC-6**

- **Contact Arrangement** — SPDT
- **Contact Form** — C
- **Test Voltage, DC or 60 Hz (Peak)** — 10 kV
- **Rated Operating Voltage (Peak)** — DC or 60 Hz — 8 kV
- **Continuous Carry Current, Max.** —
  - DC or 60 Hz — HC-2 — 25 A RMS
  - HC-4 — 15 A RMS
  - HC-6 — 8 A RMS
- **Coil Hi-Pot (Vrms, 60 Hz)** — 500 A RMS

- **Contact Capacitance** —
  - Between Open Contacts — N/A
  - Open Contacts to Ground — N/A
- **Contact Resistance, Max.** —
  - HC-2 — 0.01 ohm
  - HC-4 — 0.02 ohm
  - HC-6 — 0.5 ohm
- **Operate Time, Max.** — 6 ms
- **Release Time, Max.** — 6 ms

**Shock, 1/2 Sine (Peak)** — 50 g

**Vibration** —
- Peak — 10 g (55 to 2000 Hz)
- Operating Ambient Temperature Range — -55°C to +125°C

**Mechanical Life** —
- HC-2 and HC-4 — 2 million cycles
- HC-6 — 1 million cycle

**Weight, Nominal** — 39.69 g (1.4 oz.)

*R Contact resistance for gas-filled relays is measured at 28 Vdc, 1 Amp

**Coil Data**

<table>
<thead>
<tr>
<th>Nominal Volts DC</th>
<th>12 Vdc</th>
<th>26.5 Vdc</th>
<th>115 Vdc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max.</td>
<td>8 Vdc</td>
<td>16 Vdc</td>
<td>80 Vdc</td>
</tr>
<tr>
<td>Dropout</td>
<td>0.5 Vdc</td>
<td>1-10 Vdc</td>
<td>5-50 Vdc</td>
</tr>
<tr>
<td>Coil Resistance (±10%)</td>
<td>80 Ω</td>
<td>335 Ω</td>
<td>6000 Ω</td>
</tr>
</tbody>
</table>

Ratings listed are for 25°C, sea level conditions

**Ordering Information**

**Sample Part Number**

<table>
<thead>
<tr>
<th>Series</th>
<th>Model</th>
<th>HC-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 Vdc</td>
<td>/12Vdc</td>
<td></td>
</tr>
</tbody>
</table>

**Coil Voltage:**
- Blank = 26.5 Vdc
- /12Vdc = 12 Vdc
- /115Vdc = 115 Vdc

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
KILOVAC High Voltage Relays

Product Facts
- Smallest DPDT high voltage relay
- Vacuum dielectric for power switching low current loads
- 8 kV rating; carries 2 Amps at 32 MHz
- Tungsten contacts for power switching low current loads
- Meets requirements of MIL-R-83725

H-18 Series Make & Break Load Switching — 8 kV Relays

Product Specifications

Contact Arrangement — DPDT
Contact Form — 2C
Test Voltage, DC or 60 Hz (Peak) — 10 kV
Rated Operating Voltage (Peak) —
DC or 60 Hz — 8 kV
2.5 MHz — 5 kV
16 MHz — 3 kV
32 MHz — 2 kV

Continuous Carry Current, Max. —
DC or 60 Hz — 10 A
2.5 MHz — 7 A
16 MHz — 3 A
32 MHz — 2 A

Contact Capacitance —
Between Open Contacts — 0.8 pF
Open Contacts to Ground — 1.5 pF

Contact Resistance, Max. — 0.02 ohm
Operate Time, Max. — 15 ms
Release Time, Max. — 15 ms

Coil Data

<table>
<thead>
<tr>
<th>Volts, Nominal DC</th>
<th>12 V</th>
<th>26.5 V</th>
<th>115 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max.</td>
<td>8 Vdc</td>
<td>18 Vdc</td>
<td>80 Vdc</td>
</tr>
<tr>
<td>Dropout</td>
<td>.5-5 Vdc</td>
<td>1-10 Vdc</td>
<td>5-50 Vdc</td>
</tr>
<tr>
<td>Coil Resistance (+10%)</td>
<td>60 Ω</td>
<td>250 Ω</td>
<td>3500 Ω</td>
</tr>
</tbody>
</table>

Ordering Information

Sample Part Number — H-18 /12Vdc

Series:
- H-18

Model:
- H-18

Coil Voltage:
- Blank = 26.5 Vdc
- /12Vdc = 12 Vdc
- /115Vdc = 115 Vdc

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
K44P Make & Break Load Switching — 8 kV Relays

Product Specifications

Contact Arrangement —
SPST-Latching

Contact Form — P

Test Voltage, DC or 60 Hz (Peak) — 10 kV

Rated Operating Voltage (Peak) —
DC or 60 Hz — 8 kV
2.5 MHz — 7 kV
16 MHz — 6 kV
32 MHz — 4 kV

Continuous Carry Current, Max. —
DC or 60 Hz — 50 A
2.5 MHz — 40 A
16 MHz — 25 A
32 MHz — 20 A

Coil Hi-Pot (Vrms, 60 Hz) — 500 V

Contact Capacitance —
Between Open Contacts — 2.5 pF
Open Contacts to Ground — 2.8 pF

Contact Resistance, Max. —
0.01 ohm

Operate Time, Max. — 5 ms
Release Time, Max. — N/A

Shock, 11ms, 1/2 Sine (Peak) — 50 g

Vibration —
Peak — 20 g (55 to 2000 Hz)

Operating Ambient Temperature Range — -55°C to +85°C

Mechanical Life — 1 million cycles

Weight, Nominal — 59.53 g (2.1 oz.)

Coil Data

<table>
<thead>
<tr>
<th>Volts, Nominal</th>
<th>26.5 Vdc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latch &amp; Reset, Max.</td>
<td>23 Vdc</td>
</tr>
<tr>
<td>Dropout</td>
<td>N/A</td>
</tr>
<tr>
<td>Coil Resistance (±10%)</td>
<td>155 Ω</td>
</tr>
</tbody>
</table>

Ratings listed are for 25°C, sea level conditions

Ordering Information

Sample Part Number

<table>
<thead>
<tr>
<th>Series:</th>
<th>K44 P 3 3 4</th>
</tr>
</thead>
</table>

Contact Form: P = SPST-Latching

Coil Voltage: 3 = 26.5 Vdc, Bus Wire

High Voltage Connections:
3 = Solder Connection

Mounting:
2 = Flanged
4 = Standard

*See page 7-94 for mounting methods.

For factory-direct application assistance,
dial 800-253-4560, ext. 2055, or 805-220-2055.
K81 A/B Series Make & Break Load Switching — 10 kV Relays

Product Facts
- 10 kV PC board-mount relay
- Vacuum dielectric for power switching low current loads
- Flying leads or PCB mount for high voltage connections
- Meets requirements of MIL-R-83725
- Completely sealed; suitable for test equipment
- Panel mount available for ease of mounting

Product Specifications

<table>
<thead>
<tr>
<th>Contact Arrangement</th>
<th>K81A — SPST-NO</th>
<th>K81B — SPST-NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Form</td>
<td>K81A — A</td>
<td>K81B — B</td>
</tr>
<tr>
<td>Test Voltage, DC or 60 Hz (Peak)</td>
<td>11 kV</td>
<td></td>
</tr>
<tr>
<td>Rated Operating Voltage (Peak)</td>
<td>DC or 60 Hz — 10 kV</td>
<td></td>
</tr>
<tr>
<td>Continuous Carry Current, Max.</td>
<td>DC or 60 Hz — 5 A, 20 A or 30 A</td>
<td></td>
</tr>
<tr>
<td>Coil Hi-Pot (Vrms, 60 Hz)</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Contact Resistance, Max.</td>
<td>0.03 ohm</td>
<td></td>
</tr>
<tr>
<td>Operate Time, Max.</td>
<td>10 ms</td>
<td></td>
</tr>
<tr>
<td>Release Time, Max.</td>
<td>10 ms</td>
<td></td>
</tr>
<tr>
<td>Shock, 11ms, 1/2 Sine (Peak)</td>
<td>30 g</td>
<td></td>
</tr>
<tr>
<td>Vibration</td>
<td>Peak — 10 g (55 to 500 Hz)</td>
<td></td>
</tr>
</tbody>
</table>

Operating Ambient Temperature Range — -55°C to +85°C
Mechanical Life — 2 million cycles
Weight, Nominal — 56.7 g (2 oz.)

Notes:
1. PC pin versions carry 5 or 20 Amps, see part number at right. Flying lead and panel versions carry 30 Amp.
2. Power terminal on 20 Amp version is a larger diameter than on the 5 Amp version (.025 = 5 Amp, .064 = 20 Amp)

Coil Data

<table>
<thead>
<tr>
<th>Volts, Nominal DC</th>
<th>12 V</th>
<th>26.5 V</th>
<th>115 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max.</td>
<td>8 Vdc</td>
<td>16 Vdc</td>
<td>80 Vdc</td>
</tr>
<tr>
<td>Dropout</td>
<td>5-5 Vdc</td>
<td>1-10 Vdc</td>
<td>5-50 Vdc</td>
</tr>
<tr>
<td>Coil Resistance (±10%)</td>
<td>70 Ω</td>
<td>290 Ω</td>
<td>4700 Ω</td>
</tr>
</tbody>
</table>

Ordering Information

<table>
<thead>
<tr>
<th>Sample Part Number</th>
<th>K81 A 3 3 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series:</td>
<td>A — SPST-NO</td>
</tr>
<tr>
<td>Contact Form:</td>
<td>A — PCB Solder Connection</td>
</tr>
<tr>
<td>Coil Voltage:</td>
<td>2 = 12 Vdc, PC Board</td>
</tr>
<tr>
<td></td>
<td>5 = 115 Vdc, PC Board</td>
</tr>
<tr>
<td>High Voltage Connections:</td>
<td>A* = 20 Amp</td>
</tr>
<tr>
<td></td>
<td>3 = PCB Solder Connection</td>
</tr>
<tr>
<td>Mounting:</td>
<td>5 = PC Board</td>
</tr>
</tbody>
</table>

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
K81C Series Make & Break Load Switching — 10 kV Relays

Product Facts
- SPDT version of K81
- Vacuum dielectric for power switching low current loads
- Flying lead version will carry 10 Amps continuous current
- PCB mount version will carry 5 Amps continuous current

Product Specifications

Contact Arrangement — SPDT
Contact Form — C
Test Voltage, DC or 60 Hz (Peak) — 11 kV
Rated Operating Voltage (Peak) — DC or 60 Hz — 10 kV

Continuous Carry Current, Max. — DC or 60 Hz — See Note 1
Coil Hi-Pot (Vrms, 60 Hz) — N/A
Contact Resistance, Max. — 0.05 ohm
Operate Time, Max. — 10 ms
Release Time, Max. — 10 ms
Shock, 11ms, 1/2 Sine (Peak) — 30 g
Vibration — Peak — 10 g (55 to 500 Hz)
Operating Ambient Temperature Range — -55°C to +85°C
Mechanical Life — 2 million cycles
Weight, Nominal — 70.87 g (2.5 oz.)

Coil Data

<table>
<thead>
<tr>
<th>Volts, Nominal DC</th>
<th>12 V</th>
<th>26.5 V</th>
<th>115 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max.</td>
<td>8 Vdc</td>
<td>16 Vdc</td>
<td>80 Vdc</td>
</tr>
<tr>
<td>Dropout</td>
<td>0.5 Vdc</td>
<td>1-10 Vdc</td>
<td>5-50 Vdc</td>
</tr>
<tr>
<td>Coil Resistance (±10%)</td>
<td>70 Ω</td>
<td>290 Ω</td>
<td>4700 Ω</td>
</tr>
</tbody>
</table>

Ratings listed are for 25°C, sea level conditions

Ordering Information

Sample Part Number ▶
Series:

Contact Form:
C = SPDT

Coil Voltage:
2 = 12 Vdc, PC Board
3 = 26.5 Vdc, PC Board
5 = 115 Vdc, PC Board

High Voltage Connections:
3 = PCB Solder Connection
4 = Flying Leads

Mounting:
5 = PC Board

Note:
1.5 Amp carry for PC pin versions.
30 Amp carry for flying lead versions.
K43 Series Make & Break Load Switching — 10 kV Relays

K43A and K43B
Product Facts for K43A and K43B
- 10 kV, 25 Amps continuous current relay
- RF ratings to 32 MHz
- Vacuum dielectric for power switching low current loads
- 2 million cycle mechanical life
- QPL versions available, M83725/17 & M83725/10

K43C
Product Facts for K43C
- SPDT version of K43
- Vacuum dielectric for power switching low current loads
- Flange mounting available
- Carries 10 Amps at 32 MHz
- Meets requirements of MIL-R-83725
- QPL version available, M83725/16

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.

Product Specifications for K43A, K43B and K43C

- **Contact Arrangement**
  - K43A — SPST-NO
  - K43B — SPST-NC
  - K43C — SPDT

- **Contact Form**
  - K43A — A
  - K43B — B
  - K43C — C

- **Test Voltage, DC or 60 Hz (Peak)** — 11 kV
- **Rated Operating Voltage (Peak)** — DC or 60 Hz — 10 kV
  - 2.5 MHz — 7 kV
  - 16 MHz — 6 kV
  - 32 MHz — 4 kV
- **Continuous Carry Current, Max.** — DC or 60 Hz — 25 A
  - 2.5 MHz — 20 A
  - 16 MHz — 13 A
  - 32 MHz — 10 A
- **Coil Data**
  - **Volts, Nominal DC**
    - 12 V
    - 26.5 V
    - 115 V
  - **Pickup, Max.**
    - 8 Vdc
    - 16 Vdc
    - 80 Vdc
  - **Dropout**
    - 0.5-5 Vdc
    - 1-10 Vdc
    - 5-50 Vdc
  - **Coil Resistance (±10%)**
    - 70 Ω
    - 290 Ω
    - 4700 Ω

Ratings listed are for 25°C, sea level conditions.

**Contact Resistance, Max.** — 0.02 ohm
**Operate Time, Max.** — 10 ms
**Release Time, Max.** — 10 ms
**Shock, 11ms, 1/2 Sine (Peak)** — 50 g
**Vibration**
  - Peak — 10 g (55 to 2000 Hz)
**Operating Ambient Temperature Range** — -55°C to +125°C
**Mechanical Life** — 2 million cycles
**Weight, Nominal** — 28.35 g (1 oz.)

*See page 7-97 for turret terminal dimensions and mounting methods.

**Coil Voltage:**
- 2 = 12 Vdc, Bus Wire
- 3 = 26.5 Vdc, Bus Wire
- 5 = 115 Vdc, Bus Wire
- 7 = 12 Vdc, Turret Terminal*
- 8 = 26.5 Vdc, Turret Terminal*
- 9 = 115 Vdc, Turret Terminal*

**High Voltage Connections:**
- 3 = Solder Connection
- 4 = Standard

**Ordering Information**

- **Sample Part Number**
  - K43 A 3 3 4

**Series:**
- **Contact Form:**
  - A = SPST-NO
  - B = SPST-NC
  - C = SPDT

- **High Voltage Connections:**
  - 3 = Solder Connection
  - 4 = Standard

- **Mounting:**
  - 2 = Flanged

Catalog 5-1773450-5
Revised 9-08
www.tycoelectronics.com

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.

Dimensions are shown for reference purposes only. Specifications subject to change.
K43 Series Make & Break Load Switching — 10 kV Relays (Continued)

**KILOVAC K43P**

Make & Break Load Switching

Product Facts for K43P
- High power rating: 24 Amps DC continuous current carry
- Vacuum dielectric for power switching low current loads
- Low power consumption
- Fast operating: 5 millisecond operate time
- Meets requirements of MIL-R-83725

**KILOVAC K43R**

Make & Break Load Switching

Product Facts for K43R
- Single pole, double throw contacts with latching actuator
- Vacuum dielectric for power switching low current loads
- Carries 6 Amps at 32 MHz
- Meets requirements of MIL-R-83725

**Product Specifications for K43P and K43R**

- **Contact Arrangement**
  - K43P — SPST-Latching
  - K43R — SPDT-Latching
- **Contact Form**
  - K43P — P
  - K43R — R
- **Test Voltage, DC or 60 Hz (Peak)** — 11 kV
- **Rated Operating Voltage (Peak)**
  - DC or 60 Hz — 10 kV
  - 2.5 MHz — 7 kV
  - 16 MHz — 6 kV
  - 32 MHz — 4 kV
- **Continuous Carry Current, Max.**
  - DC or 60 Hz — 24 A
  - 2.5 MHz — 16 A
  - 16 MHz — 9 A
  - 32 MHz — 6 A
- **Coil Voltage**
  - 3 = 26.5 Vdc, Bus Wire
  - 4 = Standard

**Contact Resistance, Max.** — 0.02 ohm

**Operate Time, Max.**
- K43P — 5 ms
- K43R — 6 ms

**Release Time, Max.** — N/A

**Shock, 11ms, 1/2 Sine (Peak)** — 30 g

**Vibration**
- Peak — 7 g (55 to 2000 Hz)

**Operating Ambient Temperature Range** — -55°C to +125°C

**Mechanical Life** — 1 million cycles

**Weight, Nominal** — 28.35 g (1 oz.)

**Sample Part Number**
- [K43 P334]

**Ordering Information**

<table>
<thead>
<tr>
<th>Series</th>
<th>Contact Form</th>
<th>Coil Voltage</th>
<th>High Voltage Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>K43</td>
<td>P = SPST-Latching</td>
<td>26.5 Vdc</td>
<td>3 = Solder Connection</td>
</tr>
<tr>
<td></td>
<td>R = SPDT-Latching</td>
<td></td>
<td>4 = Standard</td>
</tr>
</tbody>
</table>

*See page 7-97 for mounting methods.*
KILOVAC High Voltage Relays

SO5 Series Make & Break Load Switching — 10 kV Relays

SO5LT —
PC Mount Version

Product Facts for SO5LT (Both versions)
- Versatile 10 kV, 5 Amp carry relay
- Vacuum dielectric for power switching low current loads
- Widely used in test equipment applications
- Flying leads or PC mount available
- Very high service life

Product Specifications for SO5LTA and SO5LTB
Contact Arrangement —
SO5LTA — SPST-NO
SO5LTB — SPST-NC
Contact Form —
SO5LTA — A
SO5LTB — B
Voltage Rating Between Contacts —
10 kV
Current Carry @ DC — 5 A
Load Switching — See chart below
Contact Resistance — 0.250 ohm
Contact Capacitance —
Between Open Contacts — 1 pF
Closed Contacts to Ground — 8 pF

Operate and Release Time —
2 ms
Shock, 11ms, 1/2 Sine (Peak) —
100 g
Vibration —
Peak — 20 g (10 to 500 Hz)
Operating Temperature Range —
-20°C to +70°C
Storage Temperature Range —
-35°C to +110°C
Insulation Resistance —
Initial — 10 gigohms
Mechanical Life — 1 billion cycles
Weight, Nominal —
28.35 g (1 oz.)

Coil Data

<table>
<thead>
<tr>
<th>Voltage, Nominal DC</th>
<th>5 V</th>
<th>12 V</th>
<th>24 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max.</td>
<td>6 Vdc</td>
<td>15 Vdc</td>
<td>28 Vdc</td>
</tr>
<tr>
<td>Dropout</td>
<td>.5 Vdc</td>
<td>2 Vdc</td>
<td>4 Vdc</td>
</tr>
<tr>
<td>Coil Resistance (+10%)</td>
<td>28 Ω</td>
<td>150 Ω</td>
<td>780 Ω</td>
</tr>
</tbody>
</table>

Ordering Information

Sample Part Number

<table>
<thead>
<tr>
<th>Series:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Form:</td>
</tr>
<tr>
<td>A = SPST-NO</td>
</tr>
<tr>
<td>B = SPST-NC</td>
</tr>
<tr>
<td>Coil Voltage:</td>
</tr>
<tr>
<td>1 = 5 Vdc</td>
</tr>
<tr>
<td>2 = 12 Vdc</td>
</tr>
<tr>
<td>3 = 24 Vdc</td>
</tr>
<tr>
<td>High Voltage Connections:</td>
</tr>
<tr>
<td>3 = Solder Connection</td>
</tr>
<tr>
<td>4 = 12” Flying Leads</td>
</tr>
<tr>
<td>Mounting:</td>
</tr>
<tr>
<td>5 = PC Covered</td>
</tr>
</tbody>
</table>

Notes:
1. Overall dimensions are all maximums.
2. Dimensions in parenthesis are in millimeters.
3. Pin dimensions tolerances are as follows: Lengths = ± .04 [1.0]
   Spacing = ± .006 [.15]
5. Coil terminals are polarity sensitive for the normally closed B version.
   X1 is positive, +, and X2 is negative, −.

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.
Dimensions are shown for reference purposes only. Specifications subject to change.

USA: 1-800-522-6752
Canada: 1-905-470-4426
Mexico: 01-800-733-8926
C. America: 52-55-1106-0803
South America: 55-11-2103-6000
Hong Kong: 852-273-1628
Japan: 81-44-844-8013
UK: 44-8706-080-208
H-14/16 Series Make & Break Load Switching — 12 kV Relays

H-14
Product Facts for H-14
- Double pole, double throw contacts
- Vacuum dielectric for power switching low current loads
- 30 Amps DC continuous current rating
- Corona shield high voltage terminals available
- Meets requirements of MIL-R-83725

H-16
Product Facts for H-16
- 12 kV rating; isolates 5 kV at 32 MHz
- Vacuum dielectric for power switching low current loads
- Double pole, double throw contacts
- Widely used as a transmit/receive switch
- Meets requirements of MIL-R-83725

Product Specifications for H-14 and H-16

Contact Arrangement — DPDT
Contact Form — 2C
Contact Voltage, DC or 60 Hz (Peak) — 15 kV
Rated Operating Voltage (Peak) — DC or 60 Hz — 12 kV
2.5 MHz — 10 kV
16 MHz — 8 kV
32 MHz — 5 kV
Continuous Carry Current, Max. — DC or 60 Hz — 30 A
2.5 MHz — H-14 — 15 A
H-16 — 10 A
16 MHz — H-14 — 10 A
H-16 — 6 A
32 MHz — H-14 — 8 A
H-16 — 4 A
Coil Hi-Pot (Vrms, 60 Hz) — 500 A

Contact Capacitance —
Between Open Contacts — 1 pF
Open Contacts to Ground — 2.5 pF
Contact Resistance, Max. —
H-14 — 0.015 ohm
H-16 — 0.03 ohm
Operate Time, Max. — 20 ms
Release Time, Max. — 20 ms
Shock, 11ms, 1/2 Sine (Peak) — 20 g
Vibration —
Peak — 10 g (55 to 500 Hz)
Operating Ambient Temperature Range — -55°C to +125°C
Mechanical Life (Operations x 10⁶) —
H-14 — 1 million cycles
H-16 — 500,000 cycles
Weight, Nominal —
H-14 — 226.8 g (8 oz.)
H-16 — 170.1 g (6 oz.)

Coil Data

Nominal Volts DC
12 Vdc
26.5 Vdc
115 Vdc
Pickup, Max. 8 Vdc 16 Vdc 80 Vdc
Dropout 5.5 Vdc 1-10 Vdc 5-50 Vdc
Coil Resistance (+10%) 24 Ω 120 Ω 2000 Ω

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.

Ordering Information

Sample Part Number ▼
Series: H- 14 /12Vdc
Model: 14 16
Coil Voltage:
Blank = 26.5 Vdc
/12Vdc = 12 Vdc
/115Vdc = 115 Vdc

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.
Product Facts
- Single pole, double throw contacts
- Vacuum dielectric for power switching low current loads
- 30 Amps DC continuous current rating
- Corona shield high voltage terminals available
- Meets requirements of MIL-R-83725

H-8 Make & Break Load Switching — 15 kV Relays

Product Specifications

Contact Arrangement — SPDT
Contact Form — C
Test Voltage, DC or 60 Hz (Peak) — 20 kV
Rated Operating Voltage (Peak) —
DC or 60 Hz — 15 kV
2.5 MHz — 12 kV
16 MHz — 10 kV
32 MHz — 6 kV
Continuous Carry Current, Max. —
DC or 60 Hz — 15 A RMS
2.5 MHz — 10 A RMS
16 MHz — 6 A RMS
32 MHz — 4 A RMS
Coil Hi-Pot (Vrms, 60 Hz) — 500 A RMS
Contact Capacitance —
Between Open Contacts — 1 pF
Open Contacts to Ground — 1.5 pF
Contact Resistance, Max. — 0.015 ohm
Operate Time, Max. — 15 ms
Release Time, Max. — 15 ms

Shock, 11ms, 1/2 Sine (Peak) — 30 g
Vibration —
Peak — 10 g (55 to 500 Hz)
Operating Temperature Range —
-55°C to +125°C
Mechanical Life — 1 million cycles
Weight, Nominal — 85 g (3 oz.)

Coil Data

<table>
<thead>
<tr>
<th>Volts, Nominal DC</th>
<th>12 V</th>
<th>26.5 V</th>
<th>115 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max.</td>
<td>8 Vdc</td>
<td>16 Vdc</td>
<td>80 Vdc</td>
</tr>
<tr>
<td>Dropout</td>
<td>0.5 Vdc</td>
<td>1-10 Vdc</td>
<td>5-50 Vdc</td>
</tr>
<tr>
<td>Coil Resistance (±10%)</td>
<td>60 Ω</td>
<td>265 Ω</td>
<td>3500 Ω</td>
</tr>
</tbody>
</table>
KC Series Make & Break Load Switching — 15 kV Relays

KC-14

Product Facts for KC-14 and KC-18
- Specifically designed for load switching applications
- Can power switch and isolate loads
- Replaces KILOVAC KC-8 and KC-12
- Meets requirements of MIL-R-83725

Product Specifications for KC-14 and KC-18
- Contact Arrangement — SPDT
- Contact Form — C
- Test Voltage, DC or 60 Hz (Peak) — 17 kV
- Rated Operating Voltage (Peak) — DC or 60 Hz — 15 kV
- Continuous Carry Current, Max. — DC or 60 Hz — 30 A
- Coil Hi-Pot (Vrms, 60 Hz) — 500 A
- Contact Capacitance — Between Open Contacts — 0.5 pF
  Open Contacts to Ground — 1 pF
- Contact Resistance, Max. — 0.025 ohm
- Operate Time, Max. — 15 ms
- Release Time, Max. — 9 ms

Shock, 11ms, 1/2 Sine (Peak) — 50 g
Vibration — Peak — 10 g (55 to 500 Hz)
Operating Ambient Temperature Range — -55°C to +125°C
Mechanical Life — 1 million cycles
Weight, Nominal — 85 g (3 oz.)

*Hot Switching, Resistive Load Life

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Current</th>
<th>Load Life Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>330 Vdc</td>
<td>17 Amps</td>
<td>10,000</td>
</tr>
<tr>
<td>330 Vdc</td>
<td>5 Amps</td>
<td>100,000</td>
</tr>
<tr>
<td>5,000 Vdc</td>
<td>2 Amps</td>
<td>100,000</td>
</tr>
<tr>
<td>10,000 Vdc</td>
<td>1 Amps</td>
<td>50,000</td>
</tr>
</tbody>
</table>

*Ratings are for normally open contacts only. No testing has been performed on normally closed contacts.

Coil Data

<table>
<thead>
<tr>
<th>Volts, Nominal DC</th>
<th>12 V</th>
<th>26.5 V</th>
<th>115 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max.</td>
<td>8 Vdc</td>
<td>16 Vdc</td>
<td>80 Vdc</td>
</tr>
<tr>
<td>Dropout</td>
<td>0.5 Vdc</td>
<td>1-10 Vdc</td>
<td>5-50 Vdc</td>
</tr>
<tr>
<td>Coil Resistance  (±10%)</td>
<td>48 Ω</td>
<td>180 Ω</td>
<td>2900 Ω</td>
</tr>
</tbody>
</table>

Ratings listed are for 25°C, sea level conditions

Ordering Information

Sample Part Number

<table>
<thead>
<tr>
<th>Series</th>
<th>Model</th>
<th>Coil Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>18</td>
<td>Blank = 26.5 Vdc /12Vdc = 12 Vdc /115Vdc = 115 Vdc</td>
</tr>
</tbody>
</table>
KiLOVAC High Voltage Relays

KC Series Make & Break Load Switching — 15 kV Relays (Continued)

**KC-2**
No Load Switching

**Product Facts**
- Vacuum dielectric for low and stable contact resistance
- Carries 50 Amps at DC; 10 Amps at 32 MHz
- Not designed for power switching

**KC-8**

**Product Facts for KC-8**
- Not recommended for new design. See KC-14 on page 7-82 for replacement.

**KC-11**
No Load Switching

**Product Facts**
- Threaded base version of KC-2
- Vacuum dielectric for low leakage current applications

**KC-12**

**Product Facts**
- Not recommended for new design. See KC-18 on page 7-67 for replacement.
- Vacuum dielectric for power switching low current loads

**Product Specifications for KC-2, KC-8, KC-11 and KC-12**

**Contact Arrangement** — SPDT

**Test Voltage, DC or 60 Hz (Peak)** — 17 kV

**Rated Operating Voltage (Peak)** —
- DC or 60 Hz — 15 kV
- 2.5 MHz — KC-2 and KC-11 — 12 kV
- 16 MHz — KC-2 and KC-11 — 9 kV
- 32 MHz — KC-2 and KC-11 — 7 kV

**Continuous Carry Current, Max.** —
- DC or 60 Hz — KC-2 and KC-11 — 50 A
- KC-8 and KC-12 — 30 A
- 2.5 MHz — KC-2 and KC-11 — 30 A
- 16 MHz — KC-2 and KC-11 — 17 A
- 32 MHz — KC-2 and KC-11 — 10 A

**Coil Data**

<table>
<thead>
<tr>
<th>Nominal Volts DC</th>
<th>12 Vdc</th>
<th>26.5 Vdc</th>
<th>115 Vdc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max.</td>
<td>8 Vdc</td>
<td>16 Vdc</td>
<td>80 Vdc</td>
</tr>
<tr>
<td>Dropout</td>
<td>-5 Vdc</td>
<td>1-10 Vdc</td>
<td>5-50 Vdc</td>
</tr>
<tr>
<td>Coil Resistance (Ω)</td>
<td>60</td>
<td>250</td>
<td>3500</td>
</tr>
<tr>
<td>Rated Operating Voltage (Peak)</td>
<td>15 ms</td>
<td>15 ms</td>
<td>15 ms</td>
</tr>
<tr>
<td>Release Time, Max.</td>
<td>9 ms</td>
<td>9 ms</td>
<td>9 ms</td>
</tr>
<tr>
<td>Shock, 11ms, 1/2 Sine (Peak)</td>
<td>50 g</td>
<td>50 g</td>
<td>50 g</td>
</tr>
<tr>
<td>Vibration Peak</td>
<td>10 g (55 to 500 Hz)</td>
<td>10 g (55 to 500 Hz)</td>
<td>10 g (55 to 500 Hz)</td>
</tr>
</tbody>
</table>

**Ordering Information**

**Sample Part Number**

**Series:**

<table>
<thead>
<tr>
<th>Model</th>
<th>2</th>
<th>8</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>KC-2</td>
<td></td>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>

**Coil Voltage:**

Blank = 26.5 Vdc /12Vdc = 12 Vdc /115Vdc = 115 Vdc

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
**KC-15**

Product Facts

- SF-6 gas-filled for power switching on the “make”
- Long load life in capacitive discharge
- Recommended for ESD testing and safety interlock applications
- Meets requirements of MIL-R-83725

---

**KC-16**

Product Facts

- Threaded base version of KC-15
- SF-6 gas-filled for power switching on the “make”
- 15 kV rating
- Meets requirements of MIL-R-83725

---

**Product Specifications for KC-15 and KC-16**

- **Contact Arrangement:** SPDT
- **Contact Form:** C
- **Test Voltage, DC or 60 Hz (Peak):** 17 kV
- **Rated Operating Voltage (Peak):** DC or 60 Hz — 15 kV
- **Continuous Carry Current, Max.:** DC or 60 Hz — 12 A
- **Coil Hi-Pot (Vrms, 60 Hz):** 500 A
- **Contact Capacitance:** Between Open Contacts — N/A
  - Open Contacts to Ground — N/A
- **Contact Resistance, Max.:** 1.0 ohm*
- **Operate Time, Max.:** 15 ms
- **Release Time, Max.:** 9 ms
- **Shock, 11ms, 1/2 Sine (Peak):** 50 g
- **Vibration:**
  - Peak — 10 g (55 to 500 Hz)

---

**Operating Ambient Temperature Range:** -55°C to +125°C

**Mechanical Life:** 1 million cycles

**Weight, Nominal:** 85 g (3 oz.)

**Note:** Contact resistance for gas-filled relays measured 28 Vdc, 1 Amp

---

**Coil Data**

<table>
<thead>
<tr>
<th>Volts, Nominal DC</th>
<th>12 V</th>
<th>26.5 V</th>
<th>115 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max.</td>
<td>8 Vdc</td>
<td>16 Vdc</td>
<td>80 Vdc</td>
</tr>
<tr>
<td>Dropout</td>
<td>.5-5 Vdc</td>
<td>1-10 Vdc</td>
<td>5-50 Vdc</td>
</tr>
<tr>
<td>Coil Resistance (±10%)</td>
<td>48 Ω</td>
<td>180 Ω</td>
<td>2900 Ω</td>
</tr>
</tbody>
</table>

Ratings listed are for 25°C, sea level conditions

---

**Ordering Information**

<table>
<thead>
<tr>
<th>Sample Part Number</th>
<th>KC-15 /12Vdc</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Series:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Model:</strong></td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>16</td>
</tr>
<tr>
<td><strong>Coil Voltage:</strong></td>
<td></td>
</tr>
<tr>
<td>Blank = 26.5 Vdc</td>
<td></td>
</tr>
<tr>
<td>/12Vdc = 12 Vdc</td>
<td></td>
</tr>
<tr>
<td>/115Vdc = 115 Vdc</td>
<td></td>
</tr>
</tbody>
</table>

---

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
KILOVAC High Voltage Relays

H-26 Series Make & Break Load Switching — 15 kV Relays

Product Facts

- Highly reliable four pole double throw relay
- Used to switch multiple loads and for polarity reversal
- Vacuum dielectric for power switching low current loads
- Meets requirements of MIL-R-83725

Product Specifications

- Contact Arrangement — 4PDT
- Contact Form — 4C
- Test Voltage, DC or 60 Hz (Peak) — 17 kV
- Rated Operating Voltage (Peak) — DC or 60 Hz — 15 kV
  2.5 MHz — 12 kV
  16 MHz — 10 kV
  32 MHz — 7 kV
- Continuous Carry Current, Max. — DC or 60 Hz — 30 A
  2.5 MHz — 10 A
  16 MHz — 6 A
  32 MHz — 4 A
- Coil Hi-Pot (Vrms, 60 Hz) — 500 A
- Contact Capacitance —
  Between Open Contacts — 1 pF
  Open Contacts to Ground — 2.5 pF
- Contact Resistance, Max. —
  0.02 ohm
- Operate Time, Max. — 30 ms
- Release Time, Max. — 30 ms
- Shock, 11ms, 1/2 Sine (Peak) — 30 g
- Vibration —
  Peak — 10 g (55 to 500 Hz)
- Operating Ambient Temperature Range — -55°C to +125°C
- Mechanical Life — 100,000 cycles
- Weight, Nominal — 340 g (12 oz.)

Coil Data

<table>
<thead>
<tr>
<th>Volts, Nominal DC</th>
<th>12 V</th>
<th>26.5 V</th>
<th>115 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max.</td>
<td>8 Vdc</td>
<td>16 Vdc</td>
<td>80 Vdc</td>
</tr>
<tr>
<td>Dropout</td>
<td>5-5 Vdc</td>
<td>1-10 Vdc</td>
<td>5-50 Vdc</td>
</tr>
<tr>
<td>Coil Resistance (±10%)</td>
<td>N/A</td>
<td>130 Ω</td>
<td>2100 Ω</td>
</tr>
</tbody>
</table>

Ratings listed are for 25°C, sea level conditions

Ordering Information

Model: H-26
Coil Voltage:
Blank = 26.5 Vdc
/12Vdc = 12 Vdc
/115Vdc = 115 Vdc

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
S05MTA

Product Facts
- Smallest 15 kV PC mount relay
- Vacuum dielectric for power switching low current loads
- SPST normally open contacts
- Very high service life

Product Specifications

Contact Arrangement — SPST-NO
Contact Form — A
Voltage Rating Between Contacts — 15 kV
Current Carry @ DC — 5 A
Load Switching — See chart below
Contact Resistance — 250 mohm
Operate/Release Time — 3/2 ms
Shock, 11ms, 1/2 Sine (Peak) — 100 g

Vibration —
Peak — 20 g (10 to 500 Hz)
Operating Temperature Range — -20°C to +70°C
Storage Temperature Range — -35°C to +125°C
Insulation Resistance —
Initial — 10 gigaohms
Mechanical Life — 100 million cycles
Weight, Nominal — 28.35 g (1 oz.)

Coil Data

<table>
<thead>
<tr>
<th>Voltage, Nominal DC</th>
<th>5 V</th>
<th>12 V</th>
<th>24 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max.</td>
<td>3.7 Vdc</td>
<td>9 Vdc</td>
<td>20 Vdc</td>
</tr>
<tr>
<td>Dropout</td>
<td>1.25 Vdc</td>
<td>1.25 Vdc</td>
<td>4 Vdc</td>
</tr>
<tr>
<td>Coil Resistance (±10%)</td>
<td>16 Ω</td>
<td>95 Ω</td>
<td>350 Ω</td>
</tr>
</tbody>
</table>

Ratings listed are for 25°C, sea level conditions

Load Switching Life in Cycles

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Current</th>
<th>Life in Cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 Vac</td>
<td>0.5 Amps</td>
<td>1,000,000</td>
</tr>
<tr>
<td>120 Vac</td>
<td>1.0 Amps</td>
<td>200,000</td>
</tr>
<tr>
<td>1000 Vac</td>
<td>200 mAmpls</td>
<td>100,000</td>
</tr>
<tr>
<td>5000 Vac</td>
<td>83 mAmpls</td>
<td>1,000</td>
</tr>
</tbody>
</table>

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
KIILOVAC High Voltage Relays

H-19
Product Facts
- 20 kV operating voltage
- Vacuum dielectric and tungsten contacts for power switching low current loads
- Double pole, double throw contacts
- Available with corona shield connectors
- Meets requirements of MIL-R-83725

H-17
Product Facts
- Will isolate 12 kV at 32 MHz
- Tungsten contacts suitable for power switching low current loads
- Available with corona shield connectors
- Meets requirements of MIL-R-83725
- QPL version available, M83725/2

Product Specifications for H-19 and H-17
Contact Arrangement — H-19 — DPDT
H-17 — SPDT
Contact Form — H-19 — 2C
H-17 — C
Test Voltage, DC or 60 Hz (Peak) — H-19 — 25 kV
H-17 — 30 kV
Rated Operating Voltage (Peak) — H-19 — 20 kV
H-17 — 25 kV
2.5 MHz — H-19 — 15 kV
H-17 — 20 kV
16 MHz — H-19 — 10 kV
H-17 — 15 kV
32 MHz — H-19 — 7 kV
H-17 — 12 kV
Continuous Carry Current, Max. — H-19 — 30 A
H-17 — 40 A
H-19 — 18 A
H-17 — 16 A

16 MHz — H-19 — 9 A
H-17 — 10 A
32 MHz — H-19 — 6 A
H-17 — 8 A
Coil Hi-Pot (Vrms, 60 Hz) — 500 A
Contact Capacitance — Between Open Contacts — 1 pF
Open Contacts to Ground — 2.5 pF
Contact Resistance, Max. — 0.015 ohm
Operate Time, Max. — H-19 — 30 ms
H-17 — 25 ms
Release Time, Max. — H-19 — 20 ms
H-17 — 25 ms
Shock, 11ms, 1/2 Sine (Peak) — H-19 — 30 g
H-17 — 25 g
Vibration — Peak — 10 g (55 to 500 Hz)
Operating Ambient Temperature Range — -55°C to +125°C
Mechanical Life — 1 million cycles
Weight, Nominal — H-19 — 241 g (8.5 oz.)
H-17 — 198.4 g (7 oz.)

Coil Data
Nominal Volts DC 12 Vdc 26.5 Vdc 115 Vdc
Pickup, Max. 8 Vdc 16 Vdc 80 Vdc
Dropout 2.5 Vdc 10 Vdc 50 Vdc
Coil Resistance (±10%) 48 Ω 225 Ω 2100 Ω
H-19 24 Ω 120 Ω 2900 Ω
H-17

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.

7-17/12Vdc
**K62 Series Make & Break Load Switching — 25 kV Relays**

**K62A and K62B**

**Product Facts**
- 25 kV relay with flying leads for ease of installation
- Vacuum dielectric and tungsten contacts for power switching low current loads
- Meets requirements of MIL-R-83725

**K62C**

**Product Facts**
- SPDT version of K62
- Vacuum dielectric for power switching low current loads
- Carries 18 Amps continuous current
- Meets requirements of MIL-R-83725

**Product Specifications for K62A, K62B and K62C**

- **Contact Arrangement**
  - K62A — SPST-NO
  - K62B — STST-NC
  - K62C — SPDT

- **Contact Form**
  - K62A — A
  - K62B — B
  - K62C — C

- **Test Voltage, DC or 60 Hz (Peak)**
  - 30 kV

- **Rated Operating Voltage (Peak)**
  - DC or 60 Hz — 25 kV

- **Continuous Carry Current, Max.**
  - DC or 60 Hz — 18 A
  - Coil Hi-Pot (Vrms, 60 Hz) — 500 A

- **Contact Resistance, Max.**
  - 0.50 ohm

- **Operate Time, Max.**
  - 15 ms

- **Release Time, Max.**
  - 15 ms

**Shock, 11 ms, 1/2 Sine (Peak)**
- 20 g

**Vibration**
- Peak — 10 g (55 to 500 Hz)

**Operating Ambient Temperature Range**
- -55°C to +85°C

**Mechanical Life**
- 1 million cycles

**Weight, Nominal**
- 340 g (12 oz.)

**Coil Data**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>12 V</th>
<th>26.5 V</th>
<th>115 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max.</td>
<td>9 Vdc</td>
<td>18 Vdc</td>
<td>90 Vdc</td>
</tr>
<tr>
<td>Dropout</td>
<td>0.5 Vdc</td>
<td>1-10 Vdc</td>
<td>5-55 Vdc</td>
</tr>
</tbody>
</table>

**Coil Resistance (±10%)**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 V</td>
<td>0.50 ohm</td>
</tr>
<tr>
<td>26.5 V</td>
<td>1.50 ohm</td>
</tr>
<tr>
<td>115 V</td>
<td>5.00 ohm</td>
</tr>
</tbody>
</table>

Ratings listed are for 25°C, sea level conditions

**Ordering Information**

**Sample Part Number**

- **Series:**
  - K62
  - A741

- **Contact Form:**
  - A = SPST-NO
  - B = SPST-NC
  - C = SPDT

- **Coil Voltage:**
  - 7 = 12 Vdc, Turret Terminal
  - 8 = 26.5 Vdc, Turret Terminal
  - 9 = 115 Vdc, Turret Terminal

- **High Voltage Connections:**
  - 4 = Flying Leads, 12"
  - 7 = Flying Leads, 72"
  - 8 = Flying Leads, 36"

- **Mounting:**
  - 1 = Threaded

---

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
**KC-20**

**Product Facts**
- Rugged, high current carry ceramic relay
- Carries 30 Amps at 32 MHz
- Copper contacts; not designed for power switching
- Meets requirements of MIL-R-83725

**KC-30**

**Product Facts**
- Normally closed version of KC-20
- Carries 55 Amps DC
- Vacuum dielectric for low leakage current applications

---

### Product Specifications for KC-20 and KC-30

<table>
<thead>
<tr>
<th>Contact Arrangement</th>
<th>KC-20 — SPST-NO</th>
<th>KC-30 — SPST-NC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contact Form</strong></td>
<td>KC-20 — X</td>
<td>KC-30 — Y</td>
</tr>
</tbody>
</table>

**Test Voltage, DC or 60 Hz (Peak)**
- KC-20 — 30 kV
- KC-30 — 28 kV

**Rated Operating Voltage (Peak)**
- DC or 60 Hz — KC-20 — 28 kV
- KC-30 — 25 kV
- 2.5 MHz — 22 kV
- 16 MHz — KC-20 — 12 kV
- KC-30 — 10 kV
- 32 MHz — KC-20 — 10 kV
- KC-30 — 9 kV

**Continuous Carry Current, Max.**
- DC or 60 Hz — KC-20 — 110 A
- KC-30 — 55 A
- 2.5 MHz — KC-20 — 60 A
- KC-30 — 30 A

16 MHz — KC-20 — 40 A
16 MHz — KC-30 — 20 A
32 MHz — KC-20 — 30 A
32 MHz — KC-30 — 15 A

Coil Hi-Pot (Vrms, 60 Hz) — 500 A

**Contact Capacitance**
- Between Open Contacts — 2.5 pF
- Open Contacts to Ground — 2.5 pF

**Contact Resistance, Max.**
- KC-20 — 0.005 ohm
- KC-30 — 0.01 ohm

**Operate Time, Max.** — 18 ms

**Release Time, Max.**
- KC-20 — 10 ms
- KC-30 — 20 ms

**Shock, 11ms, 1/2 Sine (Peak)** — 30 g

**Vibration**
- Peak — 10 g (55 to 500 Hz)

**Operating Ambient Temperature Range** — -55°C to +125°C

**Mechanical Life** — 2 million cycles

**Weight, Nominal** — 340 g (12 oz.)

---

### Coil Data

<table>
<thead>
<tr>
<th>Volts, Nominal DC</th>
<th>12 V</th>
<th>26.5 V</th>
<th>115 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max.</td>
<td>8 Vdc</td>
<td>16 Vdc</td>
<td>80 Vdc</td>
</tr>
<tr>
<td>Dropout</td>
<td>5-5 Vdc</td>
<td>1-10 Vdc</td>
<td>5-50 Vdc</td>
</tr>
</tbody>
</table>

Coil Resistance (±10%) | 24 Ω | 120 Ω | 2000 Ω |

Ratings listed are for 25°C, sea level conditions

### Ordering Information

**Sample Part Number**

**Series:**
- KC-20 /12Vdc

**Model:**
- KC-20
- KC-30

**Coil Voltage:**
- Blank = 26.5 Vdc
- /12Vdc = 12 Vdc
- /115Vdc = 115 Vdc

---

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
KC-Series — 25 kV Relays

KC-22, KC-32
Make & Break Load Switching
Product Facts for KC-22
- Tungsten contacts for power switching

Product Facts for KC-32
- Normally closed version of KC-22
- Vacuum dielectric for power switching low current loads

KC-28, KC-38
Make Only Load Switching
Product Facts for KC-28
- SF-6 gas-filled for capacitive discharge and "make only" applications
- Capable of switching 2000 Amps peak capacitive discharge for 400 nanoseconds

Product Facts for KC-38
- Normally closed version of KC-28
- SF-6 gas-filled for capacitive discharge and "make only" applications

Contact Arrangement —
KC-22 and KC-28 — SPST-NO
KC-32 and KC-38 — SPST-NC

Contact Form —
KC-22 and KC-28 — X
KC-32 and KC-38 — Y

Test Voltage, DC or 60 Hz (Peak) —
28 kV

Rated Operating Voltage (Peak) —
DC or 60 Hz — 25 kV

Continuous Carry Current, Max. —
DC or 60 Hz — KC-22 — 65 A
KC-33 — 45 A
KC-28 — 30 A
KC-38 — 15 A

Coil Hi-Pot (Vrms, 60 Hz) — 500 A

Contact Capacitance —
Between Open Contacts — KC-22 and KC-32 — 2.5 pF
Open Contacts to Ground —
KC-22 and KC-32 — 2.5 pF

Contact Resistance, Max. —
KC-22 — 0.005 ohm
KC-33 — 0.01 ohm
KC-28 — 1.0 ohm*
KC-38 — 1.0 ohm*

Operate Time, Max. — 18 ms
Release Time, Max. —
KC-22 and KC-28 — 10 ms
KC-32 and KC-38 — 20 ms

Shock, 11 ms, 1/2 Sine (Peak) —
30 g

Vibration —
Peak — 10 g (55 to 500 Hz)

Operating Ambient Temperature Range — -55°C to +125°C

Mechanical Life — 2 million cycles

Weight, Nominal — 340 g (12 oz.)

Coil Data

<table>
<thead>
<tr>
<th>Volts, Nominal DC</th>
<th>12 V</th>
<th>26.5 V</th>
<th>115 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max.</td>
<td>8 Vdc</td>
<td>16 Vdc</td>
<td>80 Vdc</td>
</tr>
<tr>
<td>Dropout</td>
<td>.5-5 Vdc</td>
<td>1-10 Vdc</td>
<td>5-50 Vdc</td>
</tr>
<tr>
<td>Coil Resistance (±10%)</td>
<td>24 Ω</td>
<td>120 Ω</td>
<td>2000 Ω</td>
</tr>
</tbody>
</table>

Ratings listed are for 25°C, sea level conditions

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.

Ordering Information

Sample Part Number

<table>
<thead>
<tr>
<th>KC-22 /12Vdc</th>
</tr>
</thead>
</table>

Series:

<table>
<thead>
<tr>
<th>Model</th>
<th>KC-22</th>
<th>KC-32</th>
<th>KC-28</th>
<th>KC-38</th>
</tr>
</thead>
</table>

Coil Voltage:

<table>
<thead>
<tr>
<th>Blank = 26.5 Vdc</th>
<th>/12Vdc = 12 Vdc</th>
<th>/115Vdc = 115 Vdc</th>
</tr>
</thead>
</table>
KILOVAC High Voltage Relays

H-23/24 Series Make & Break Load Switching — 30 kV Relay

(Not recommended for new designs)

Product Facts
- See K61 or K62 series for latest generation products
- Vacuum dielectric for power switching low current loads

Product Specifications

Contact Arrangement —
H-23 — SPST-NC
H-24 — SPST-NO

Contact Form —
H-23 — B
H-24 — A

Test Voltage, DC or 60 Hz (Peak) —
35 kV

Rated Operating Voltage (Peak) —
DC or 60 Hz — 30 kV
2.5 MHz — 24 kV
16 MHz — 19 kV
32 MHz — 7 kV

Continuous Carry Current, Max. —
DC or 60 Hz — 30 A
2.5 MHz — 20 A
16 MHz — 12 A
32 MHz — 7 A

Coil Hi-Pot (Vrms, 60 Hz) — 500 A

Contact Capacitance —
Between Open Contacts — N/A
Open Contacts to Ground — N/A

Contact Resistance, Max. —
0.015 ohm

Operate Time, Max. — 30 ms
Release Time, Max. — 20 ms

Shock, 11ms, 1/2 Sine (Peak) —
20 g

Vibration —
Peak — 10 g (55 to 500 Hz)

Operating Ambient Temperature Range — -55°C to +125°C

Mechanical Life — 1 million cycles

Weight, Nominal — 198.4 g (7 oz.)

Coil Data

<table>
<thead>
<tr>
<th>Volts, Nominal DC</th>
<th>12 V</th>
<th>26.5 V</th>
<th>115 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max.</td>
<td>8 Vdc</td>
<td>16 Vdc</td>
<td>80 Vdc</td>
</tr>
<tr>
<td>Dropout</td>
<td>5-5 Vdc</td>
<td>1-10 Vdc</td>
<td>5-50 Vdc</td>
</tr>
<tr>
<td>Coil Resistance (+10%)</td>
<td>24</td>
<td>120 Ω</td>
<td>2000 Ω</td>
</tr>
</tbody>
</table>

Ratings listed are for 25°C, sea level conditions

Ordering Information

Sample Part Number

Series: H-23
H-24

Model: /12Vdc
Blank = 26.5 Vdc
/12Vdc = 12 Vdc
/115Vdc = 115 Vdc
**Product Facts**

- SF-6 gas-filled relay is excellent for capacitive discharge applications
- Widely used in test equipment and medical instruments
- Fully operable in air and suitable for adverse environments
- Contact forms A, B & C
- 35 kV rating in compact, durable package
- Lower cost version of K61 series

**Product Specifications**

**Contact Arrangement/Form**
- SPST-NO / A
- SPST-NC / B
- SPDT / C

**Test Voltage, DC or 60 Hz (Peak)**
- 40 kV

**Rated Operating Voltage (Peak)**
- DC or 60 Hz — 35 V

**Continuous Carry Current, Max.**
- DC or 60 Hz — 10 A

**Contact Resistance, Max.**
- 1.0Ω

**Shock, 11ms, 1/2 Sine (Peak)**
- 20 g

**Vibration**
- Peak — 10 g (55 to 500 Hz)

**Operating Ambient Temperature**
- Range — -55°C to +85°C

**Mechanical Life**
- 1 million cycles

**Weight, Nominal**
- 297.7g (10.5 oz.)

**Coil Data**

<table>
<thead>
<tr>
<th>Volts, Nominal DC</th>
<th>12 V</th>
<th>26.5 V</th>
<th>115 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max.</td>
<td>30 Vdc</td>
<td>125 Vdc</td>
<td>2000 Vdc</td>
</tr>
<tr>
<td>Dropout</td>
<td>5-5 Vdc</td>
<td>1-10 Vdc</td>
<td>5-50 Vdc</td>
</tr>
<tr>
<td>Coil Resistance (±10%)</td>
<td>24</td>
<td>120 Ω</td>
<td>2000 Ω</td>
</tr>
</tbody>
</table>

Ratings listed are for 25°C, sea level conditions

**Ordering Information**

**Sample Part Number**

<table>
<thead>
<tr>
<th>Series</th>
<th>Contact Form</th>
<th>Coil Voltage</th>
<th>High Voltage Connections</th>
<th>Mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B = SPST-NC</td>
<td>C = SPDT</td>
<td>4 = Flying Leads, 12&quot;</td>
<td>1 = Threaded</td>
</tr>
<tr>
<td>7 = 12 Vdc, Turret Terminal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 = 26.5 Vdc, Turret Terminal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 = 115 Vdc, Turret Terminal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 = Flying Leads, 72&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 = Flying Leads, 36&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
KILOVAC High Voltage Relays

K60C (35 kV)*
Product Facts
- 35 kV rating when operated in oil or potting
- Smallest 35 kV rated relay available

*Customer must isolate high voltage terminals using suitable dielectric such as oil or potting

Product Specifications
Contact Arrangement — SPDT
Contact Form — C
Test Voltage, DC or 60 Hz (Peak) — 37 kV**
Rated Operating Voltage (Peak) — DC or 60 Hz — 35 kV**
Continuous Carry Current, Max. — DC or 60 Hz — 10 A RMS
Coil Hi-Pot (Vrms, 60 Hz) — 500 A RMS
Contact Resistance, Max. — N/A
Operate Time, Max. — 15 ms
Release Time, Max. — 15 ms

Shock, 11ms, 1/2 Sine (Peak) — 20 g
Vibration — Peak — 10 g (55 to 500 Hz)
Operating Ambient Temperature Range — -55°C to +85°C
Mechanical Life — 1 million cycles
Weight, Nominal — 93.6 g (3.3 oz.)

Note:
**37 kV test voltage, 35 kV operate voltage when operated in oil.

Coil Data
<table>
<thead>
<tr>
<th>Volts, Nominal DC</th>
<th>12 V</th>
<th>26.5 V</th>
<th>115 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max.</td>
<td>9 Vdc</td>
<td>18 Vdc</td>
<td>90 Vdc</td>
</tr>
<tr>
<td>Coil Resistance (±10%)</td>
<td>30 Ω</td>
<td>125 Ω</td>
<td>2400 Ω</td>
</tr>
</tbody>
</table>

Ratings listed are for 20°C, sea level conditions

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
K61 Series Make Only Load Switching — 35 kV Relays

K61A and K61B
Product Facts for K61A and K61B
- SF-6 gas-filled relay excellent for capacitive discharge applications
- Widely used in test equipment and medical instruments
- Fully operable in air and suitable for adverse environments

K61C
Product Facts for K61C
- 35 kV rating in compact, durable package
- SF-6 gas-filled relay excellent for capacitive discharge applications
- SPDT version of K61

Product Specifications for K61A, K61B and K61C
Contact Arrangement —
K61A — SPST-NO
K61B — SPST-NC
K61C — SPDT
Contact Form —
K61A — A
K61B — B
K61C — C
Test Voltage, DC or 60 Hz (Peak) — 40 kV
Rated Operating Voltage (Peak) —
DC or 60 Hz — 35 kV
Continuous Carry Current, Max. —
DC or 60 Hz — 10 A
Coil Hi-Pot (Vrms, 60 Hz) — 500 A
Contact Resistance, Max. — 1.0 ohm*
Operate Time, Max. — 15 ms
Release Time, Max. — 15 ms
Shock, 11ms, 1/2 Sine (Peak) — 20 g

Vibration —
Peak — 10 g (55 to 500 Hz)
Operating Ambient Temperature Range — -55°C to +65°C
Mechanical Life — 1 million cycles
Weight, Nominal — 340 g (12 oz.)

Note:
*Contact resistance for gas-filled relays measured at 28 Vdc, 1 Amp

Coil Data
<table>
<thead>
<tr>
<th>Volts, Nominal DC</th>
<th>12 V</th>
<th>26.5 V</th>
<th>115 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, Max.</td>
<td>9 Vdc</td>
<td>18 Vdc</td>
<td>90 Vdc</td>
</tr>
<tr>
<td>Dropout</td>
<td>.5 Vdc</td>
<td>1-10 Vdc</td>
<td>5-50 Vdc</td>
</tr>
<tr>
<td>Coil Resistance (±10%)</td>
<td>30 Ω</td>
<td>125 Ω</td>
<td>2000 Ω</td>
</tr>
</tbody>
</table>

Ratings listed are for 25°C, sea level conditions

Ordering Information
Sample Part Number
K61 A 7 4 1
Series: A = SPST-NO B = SPST-NC C = SPDT
Coil Voltage:
7 = 12 Vdc, Turret Terminal
8 = 26.5 Vdc, Turret Terminal
9 = 115 Vdc, Turret Terminal
High Voltage Connections:
4 = Flying Leads, 12"
7 = Flying Leads, 72"
8 = Flying Leads, 36"
Mounting:
1 = Threaded

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
K64C
Make Only Load Switching

Product Facts for K64C
- SF-6 gas-filled relay ideal for high voltage isolation or “make only” power switching
- 50 kV rating in compact package
- High voltage leads and encapsulation allow full operation in air

H-25
Make & Break Load Switching

Product Facts for H-25
- Vacuum relay provides low contact resistance
- Vacuum dielectric for power switching low current loads

Product Specifications for K64C and H-25

Contact Arrangement — SPDT
Contact Form — C
Test Voltage, DC or 60 Hz (Peak) — K64C — 55 kV
DC or 60 Hz — 60 kV
Rated Operating Voltage (Peak) — DC or 60 Hz — 50 kV
Continuous Carry Current, Max. — DC or 60 Hz — K64C — 10 A
H-25 — 30 A
Coil Hi-Pot (Vrms, 60 Hz) — 500 A
Contact Resistance, Max. — K64C — 1.0 ohm*
H-25 — 0.015 ohm
Operate Time, Max. — K64C — 15 ms
H-25 — 60 ms
Release Time, Max. — K64C — 15 ms
H-25 — 60 ms

Shock, 11ms, 1/2 Sine (Peak) — K64C — 10 g
H-25 — 15 g
Vibration —
Peak — 10 g (55 to 500 Hz)
Operating Ambient Temperature Range — -55°C to +85°C
Mechanical Life — K64C — 1 million cycles
H-25 — 500,000 cycles
Weight, Nominal — K64C — 340 g (12 oz.)
H-25 — 850.5 g (30 oz.)

Note: *Contact resistance for gas-filled relays measured at 28 Vdc, 1 Amp

Coil Data

<table>
<thead>
<tr>
<th></th>
<th>K64C</th>
<th>H-25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Volts DC</td>
<td>26.5 Vdc</td>
<td>26.5 Vdc</td>
</tr>
<tr>
<td>Pickup, Max.</td>
<td>18 Vdc</td>
<td>16 Vdc</td>
</tr>
<tr>
<td>Dropout</td>
<td>1-10 Vdc</td>
<td>1-10 Vdc</td>
</tr>
<tr>
<td>Coil Resistance (±10%)</td>
<td>80 Ω</td>
<td>120 Ω</td>
</tr>
</tbody>
</table>

Ratings listed are for 25°C, sea level conditions

Ordering Information

Sample Part Number — K64C841

Series:
Contact Form: C = SPDT

Coil Voltage:
8 = 26.5 Vdc, Turret Terminal

High Voltage Connections:
4 = Flying Leads, 12"
7 = Flying Leads, 72"
8 = Flying Leads, 36"

Mounting:
1 = Threaded

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
K70 Series Make Only Load Switching — 70 kV Relays

K70A and K70B
Product Facts
- New, small, compact 70 kV relay package
- SF-6 gas-filled for capacitive discharge and high voltage isolation applications
- Suitable for charging and discharging of high voltage capacitors
- Safe for use in adverse environments

K70C
Product Facts
- SPDT version of K70A
- SF-6 gas-filled for capacitive discharge and high voltage isolation applications
- Suitable for charging and discharging of high voltage capacitors

Product Specifications for K70A, K70B and K70C
Contact Arrangement —
K70A — SPST-NO  
K70B — SPST-NC  
K70C — SPDT
Contact Form —
K70A — A  
K70B — B  
K70C — C
Test Voltage, DC or 60 Hz (Peak) — 75 kV
Rated Operating Voltage (Peak) —
DC — 70 kV  
60 Hz RMS — 30 kV
Continuous Carry Current, Max. —
DC or 60 Hz — 10 A  
Coil Hi-Pot (Vrms, 60 Hz) — 500 A
Contact Capacitance —
Between Open Contacts — N/A  
Open Contacts to Ground — N/A
Contact Resistance, Max. — 2.0 ohm*

Operate Time, Max. — 20 ms
Release Time, Max. — 15 ms
Shock, 11ms, 1/2 Sine (Peak) — 20 g
Vibration —
Peak — 10 g (55 to 500 Hz)
Operating Ambient Temperature Range — 0°C to +85°C
Mechanical Life — 500,000 cycles
Weight, Nominal — 510.3 g (18 oz.)

Note: *Contact resistance for gas-filled relays measured at 28 Vdc, 1 Amp.

Coil Data
Volts, Nominal — 26.5 Vdc
Pickup, Max. — 22 Vdc
Dropout — 1-10 Vdc
Coil Resistance (±10%) — 75 Ω
Ratings listed are for 25°C, sea level conditions

Ordering Information
Sample Part Number —
K70 A 8 4 1
Series:
Contact Form:
A = SPST-NO  
B = SPST-NC  
C = SPDT
Coil Voltage:
8 = 26.5 Vdc, Turret Terminal
High Voltage Connections:
4 = Flying Leads, 12”  
7 = Flying Leads, 72”  
8 = Flying Leads, 36”
Mounting:
1 = Threaded

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
Mounting Methods

KILOVAC “stacked ceramic” series relays can be easily mounted in any of the several ways shown below. The relay base should be mounted to a ground potential for high voltage applications. KILOVAC relays are not position sensitive and can be mounted in any orientation.

Optional Coil Turret Terminals for PD5, PD10; K41, K43 Types

2 coil terminals equally spaced on .21 (8.1) OC

.041 (2.3)

Figure 1.

Standard Flange Mounting

Threaded Chassis Holes

Optional Flange Mounting for K44

Specify 7th digit of relay part number as "9"

1.02 (48.6)

.030 thick (76)

Figure 2.

Figure 3.

Optional Flange Mounting for PD5, PD10; K40, K41, K43 and K45 types

141 (3.58) thru 3 holes E3.5 SP on .375 (9.5) BC

Specify 7th digit of relay part number as "9"

Figure 4.

Spring Clip Mounting

High Voltage Section must extend beyond mounting surface.

Figure 5. Seastrom Manufacturing (800/447-3927 or 208/737-4300) Part Number 4502-53-50-2N or similar.

Strap Mounting

Figure 6. Adel Fasteners 9320010 (stainless & silicone) 9320002 (carbon steel & neoprene)

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.

www.tycoelectronics.com
A number of KILOVAC relays are available with special, anti-corona high voltage connectors. Refer to the chart to determine if high voltage connectors are available for your model relay. These connectors can be ordered separately, by part number, or at the same time you order your relays (for “H: relays only) by simply adding the letter “C” to the part number. For instance, if you wish to purchase an H-8 relay with special connectors, you should order an “H-8C”. If you already have an H-8, you can order three Part Number 0510 connectors and install them yourself by removing the standard solder lugs and carefully installing the connectors so as not to damage the glass-to-metal seals.

### Optional High Voltage Connectors

<table>
<thead>
<tr>
<th>Relay Model</th>
<th>Connector Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-8</td>
<td>0510</td>
</tr>
<tr>
<td>H-14</td>
<td></td>
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<tr>
<td>H-16</td>
<td></td>
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<tr>
<td>H-19</td>
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<td>H-26</td>
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<td>H-17</td>
<td>1886</td>
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<td>H-23</td>
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<td>H-24</td>
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</tr>
<tr>
<td>EV250-1A</td>
<td>2005</td>
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<tr>
<td>EV250-1B</td>
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<tr>
<td>EV250-2A</td>
<td></td>
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<tr>
<td>EV250-2B</td>
<td></td>
</tr>
<tr>
<td>EV250-8A</td>
<td></td>
</tr>
<tr>
<td>EV250-8B</td>
<td></td>
</tr>
<tr>
<td>EV250-5A</td>
<td>2625</td>
</tr>
</tbody>
</table>

### Connectors for EV250-1A, 1B, 2A & 2B

Tyco Electronics supplies a connector with 7 leads attached. Order Part Number 2005, Part Number 1618004-1.
Special Connectors (Continued)

Standard Lug Connectors

<table>
<thead>
<tr>
<th>Relay Model</th>
<th>Connector Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-18</td>
<td>0575</td>
</tr>
<tr>
<td>H-17</td>
<td>1447</td>
</tr>
<tr>
<td>KM-13</td>
<td>6810</td>
</tr>
<tr>
<td>H-14</td>
<td>8488</td>
</tr>
</tbody>
</table>

AC Coil Operation

All Tyco Electronics KILOVAC relays are supplied with a DC coil. If you wish to operate the relay with AC, you may order a bridge rectifier as Part Number 0260.

Bus Bar Connector Option for EV, LEV, CAP and MAP Products

For factory-direct application assistance, dial 800-253-4560, ext. 2055, or 805-220-2055.
Application Notes for EV/LEV Contactors

Introduction - Product Capabilities and Typical Applications

Tyco Electronics KILOVAC EV and LEV contactors are designed to be the highest performance, smallest and lightest weight, sealed High Voltage contactors in the industry. With current carrying capability of up to 500A and power switching up to 200kW, they are used in a variety of industrial, marine, automotive, and commercial applications. Primarily designed to switch resistive loads, they can be used in a variety of circuit applications bearing in mind a few important considerations. This application note focuses on a few of the more common circuit configurations, and what to consider when selecting, installing and using the contactors.

1. Installation

EV/LEV contactors can be mounted in any orientation, and due to the nature of their hermetic seal and isolated enclosure, can be mounted in close proximity to other equipment. However, care must be taken with regard to the termination of the power cables to the main terminals. It is important that the main power connection lugs are mated directly to the terminal seats. Be sure that the hardware stackup is in the proper order, and that washers and other spacers are not placed between the lug and terminal seat. Excessive connection resistance can cause considerable power dissipation and terminal heating at high current carry.

Refer to Figure 1 and Table I for the recommended hardware stackup and torque.

2. Coils, Drive Circuits and Coil Economizing

Since the power required to close the contacts is generally much greater than the required holding power, many KILOVAC contactors can be packaged with low-profile coils that utilize either an electronic economizer (switchmode PWM), or mechanical cut-throat economizer. The economizer lets-through the higher power required for contact closure, then reduces the power for holding, greatly reducing the coil power consumption and heating. These circuits are packaged with the contactor, and in most cases include coil suppression components as well. For customers who wish to provide their own circuitry, Tyco Electronics can provide suggestions for driving the coils of all versions of contactors. Single coil, uneconomized products are also available in the LEV product line. These coils are designed to operate at nominal power over all specified voltage and temperature ranges without economizing circuitry. DC Coils up to 400Vdc and AC coils with integrated converters are available up to 240Vac.

3. Load Types and Power Switching Recommendations

In general, all EV/LEV contactors are designed primarily for connection and interruption of resistive loads and slightly inductive loads (L/R<1ms). High currents (up to 2000A) can be interrupted in case of circuit faults, and high continuous currents upwards of 500A can be maintained through closed contacts. Some important points to consider are:

a. Closing into current spikes due to uncharged filter capacitors. Capacitors should be pre-charged whenever possible to avoid excessive contact erosion and nuisance welds. Keep inrush current spikes below 650A at all times. Care should also be taken when considering other high-inrush loads such as lamps or motors.

b. Large current spikes through closed contacts. Large current spikes through closed contacts in excess of 3000A can sometimes cause spot welding or contact levitation.

c. Circuit inductance. Contactor break-arcs generally last as long as it takes to dissipate the stored inductive energy of the load (t(arc) = 1.1L/R).

Longer arcs due to circuit inductance can accelerate contact wear, and in extreme cases, can cause contactor failure. Tyco Electronics recommends that the time constant of the load be less than 1ms for safe operation and maximum life.

Contactor life is a function of the power level switched. Higher make/break currents erode contact materials faster and accelerate loss of dielectric withstanding between the open contacts. Figure 2 can be used as a guideline for estimating product life at a given load.

<table>
<thead>
<tr>
<th>THREAD ENGAGEMENT (turns)</th>
<th>TORQUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5</td>
<td>Use longer fastener</td>
</tr>
<tr>
<td>5 TO 7</td>
<td>7.9 Nm (70 in-lb) MAX</td>
</tr>
<tr>
<td>7 TO 8</td>
<td>9.0 Nm (80 in-lb) MAX</td>
</tr>
<tr>
<td>8 TO 11</td>
<td>9.0 Nm (80 in-lb)</td>
</tr>
<tr>
<td></td>
<td>11 Nm (100 in-lb) MAX</td>
</tr>
<tr>
<td>Mounting Feet (all)</td>
<td>1.7-3.3 Nm (30-35 in-lb)</td>
</tr>
</tbody>
</table>

Table I

Use the same guidelines and torque maximum values for stud terminal contactors as well.
Application Notes for EV/LEV Contactors (Continued)

4. Recommended Conductor Sizes for Continuous Current Carry

Many sources exist for recommending the proper conductor size for a given current carry. Many of these sources are concerned primarily with wire insulation safety issues. Cable bundling, conduit types, length of runs, etc., are also important considerations. With regard to a contactor placed in line with the conductors, it is important to make sure that the wire size is sufficient such that the contactor terminals themselves do not overheat, leading to a failure of the device. In most cases, the primary path for removal of heat from the contactor terminals is the conductors themselves. Convection to atmosphere and conduction via the base mountings play a lesser role in this type of contactor due to the nature of the construction. Tyco Electronics has performed basic characterization of many of the styles of contactors discussed herein, and the data is presented in Figure 3. The recommended maximum power terminal temperature for all EV/LEV contactors is 150°C continuous and 175°C for 1 hour.

For applications requiring larger conductors than can practically be installed with single 4/0 AWG cable and lugs, adapter buss extensions can be obtained from Tyco Electronics.

5. Auxiliary Circuits

Auxiliary contacts are available on most models. Configurations available are: SPST-NO, SPST-NC and SPDT. Auxiliary contacts are rated at 125Vac/1A or 30Vdc/3A. Contacts with gold plating for low level loads are also available. For circuit voltage below 10V/0.1A, gold contacts are recommended.

The auxiliary contact actuating method will indicate the true position of the main contacts. The auxiliary contact actuation is directly coupled to the main contact moving bridge, and will not indicate “open” unless both contact gaps of the double-make, Form X contact are fully disconnected. Keep in mind that the auxiliary contact is mainly a status indication, and should not be used to directly power other loads such as a relay coil or high power lamp load.

6. Environmental Considerations

All KILOVAC contactors are characterized for operation in thermal, vibration, moisture and fluid environments. Consult the appropriate data sheet for limits concerning shock, vibration, temperature range and altitude limits. In some cases, there may be variations in limits with regard to “specified operation” or “survival only”.

7. Custom Configurations

Most parts can be ordered with a variety of combinations of main terminal and coil configurations, auxiliary contacts, interface connectors, coil voltages, etc. If you have a requirement for a particular configuration not shown on the data sheet, consult the factory for information regarding custom configurations.

8. Summary

This Application Note is meant to address some of the more common questions regarding the use of EV/LEV contactors. In all cases, please refer to the applicable product data sheet for specific information. Also, Product Application Engineers are available to answer questions regarding these products by calling 800-253-4560 x2055, or 805-220-2055.
Introduction - Product Capabilities
And Typical Applications
Tyco Electronics KILOVAC MAP/CAP contactors are designed to be the highest performance, smallest and lightest weight, sealed High Voltage contactors in the industry. With current carrying capability of up to 500A and power switching up to 200kW, they are used in a variety of commercial aerospace and military applications. Primarily designed to switch resistive loads, they can be used in a variety of circuit applications bearing in mind a few important considerations. This application note focuses on a few of the more common circuit configurations, and what to consider when selecting, installing and using the contactors.

1. Installation
Tyco Electronics KILOVAC MAP/CAP contactors can be mounted in any orientation, and due to the nature of their hermetic seal and isolated enclosure, can be mounted in close proximity to other equipment. However, care must be taken with regard to the termination of the power cables to the main terminals. It is important that the main power connection lugs are mated directly to the terminal seats. Be sure that the hardware stackup is in the proper order, and that washers and other spacers are not placed between the lug and terminal seat. Extraneous connection resistance can cause considerable power dissipation and terminal heating at high current carry. Refer to Figure 1 and Table I for the recommended hardware stackup and torque.

2. Coils, Drive Circuits and Coil Economizing
Since the power required to close the contacts is generally much greater than the required holding power, many contactors can be packaged with low-profile coils that utilize either an electronic economizer (switchmode PWM, electronic cut-throat), or mechanical cutthroat economizer. The economizer lets-through the higher power required for contact closure, then reduces the power for holding, greatly reducing the coil power consumption and heating. These circuits are packaged with the contactor, and in most cases include coil suppression components as well. For customers who wish to provide their own circuitry, Tyco Electronics can provide suggestions for driving the coils of all versions of contactors. Four types of actuators are typically used:

a. Single Coil requiring customer economizer circuit
b. Single Coil with supplied electronic economizer
c. Dual Coil with supplied mechanical "cut-throat" economizer
d. Dual Coil with supplied electrical "cut-throat" economizer

The advantages of each type of coil circuit are shown in Table II.

3. Load Types and Power Switching Recommendations
In general, all MAP/CAP contactors are designed primarily for connection and interruption of resistive loads and slightly inductive loads (L/R<1ms). High currents (up to 2000A) can be interrupted in case of circuit faults, and high continuous currents upwards of 500A can be maintained through closed contacts. Some important points to consider are:

a. Closing into current spikes due to uncharged filter capacitors. Capacitors should be pre-charged whenever possible to avoid excessive contact erosion and nuisance welds. Keep inrush current spikes below 650A at all times. Care should also be taken when considering other high-inrush loads such as lamps or motors.

<table>
<thead>
<tr>
<th>Type</th>
<th>Advantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic PWM</td>
<td>Operates over widest voltage range</td>
</tr>
<tr>
<td>Electronic CT</td>
<td>Simple, Robust, EMC Compliant</td>
</tr>
<tr>
<td>Mechanical CT</td>
<td>Simple, robust, fastest operate time</td>
</tr>
<tr>
<td>Single Coil - (customer economized)</td>
<td>Flexibility, lower initial cost</td>
</tr>
</tbody>
</table>

Use the same guidelines and torque maximum values for stud terminal contactors as well.

<table>
<thead>
<tr>
<th>THREAD ENGAGEMENT(turns)</th>
<th>TORQUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5</td>
<td>Use longer fastener</td>
</tr>
<tr>
<td>5 TO 7</td>
<td>7.9 Nm (70 in-lb) MAX</td>
</tr>
<tr>
<td>7 TO 8</td>
<td>9.0 Nm (80 in-lb) MAX</td>
</tr>
<tr>
<td>8 TO 11</td>
<td>11.1 Nm (100 in-lb) MAX</td>
</tr>
<tr>
<td>Mounting Feet (all)</td>
<td>1.7-3.3 Nm (30-35 in-lb)</td>
</tr>
</tbody>
</table>

Table I

Table II

Coil Configurations
Application Notes for MAP/CAP Contactors (Continued)

b. Large current spikes through closed contacts. Large current spikes through closed contacts in excess of 3000A can sometimes cause spot welding or contact levitation. Consult with the factory if your application requires passing large current pulses. Many contactors can be ordered with "Dual Contact" arrangements (Arcing contacts of harder material in parallel with high current carry material).

c. Circuit inductance. Contactor break-arcs generally last as long as it takes to dissipate the stored inductive energy of the load \( t(\text{arc}) = 1.1L/R \).

Longer arcs due to circuit inductance can accelerate contact wear, and in extreme cases, can cause contactor failure. Tyco Electronics recommends that the time constant of the load be less than 1ms for safe operation and maximum life.

Contactor life is a function of the power level switched. Higher make/break currents erode contact materials faster and accelerate loss of dielectric withstanding between the open contacts. Figure 2 can be used as a guideline for estimating product life at a given load.

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The recommended maximum power terminal temperature for all MAP/CAP contactors is 150°C continuous and 175°C for 1 hour.

![Recommended Conductor Sizes](image3.png)

For applications requiring larger conductors than can practically be installed with single 4/0 AWG cable and lugs, adapter buss extensions can be obtained from Tyco Electronics.

5. Auxiliary Circuits

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Most parts can be ordered with a variety of combinations of main terminal and coil configurations, auxiliary contacts, interface connectors, coil voltages, etc. If you have a requirement for a particular configuration not shown on the data sheet, consult the factory for information regarding custom configurations.

8. Summary
This Application Note is meant to address some of the more common questions regarding the use of MAP/CAP contactors. In all cases, please refer to the applicable product data sheet for specific information.

Also, Product Application Engineers are available to answer questions regarding these products by calling 800-253-4560 x2055, or 805-220-2055.

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**Introduction - Reducing Coil Power Dissipation through the use of PWM Circuits**

The coil power of most Tyco Electronics KILOVAC Relays and Contactors can be reduced after Pickup by using several economizing schemes. One of the most popular methods used in many of our standard products, and one that is suitable for implementation by customers, is the Pulse Width Modulated (PWM) coil driver.

1. Typical PWM Coil Drive Circuit

Figure 1 shows a typical PWM coil drive/economizer circuit.

![PWM Coil Drive Circuit Diagram](image)

Fast Drop-out FET stays on during operation. FDO and Power can be applied simultaneously.

Filtering/Protection should be applied to FET gates as required.

For higher energy coils, additional TVS protection may be required across FET drain-to-source.

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**Note:**
Dimensions are shown for reference purposes only. Specifications subject to change.
This fast opening is useful for circuit interruption, and it allows the over travel mechanism of the contact actuator to work effectively in breaking minor contact welds that may occur when closing the contacts.

Allowing the free-wheeling diode to remain across the coil would significantly increase the contact opening time and opening speed, and possibly result in nuisance contact welds and/or reduced capability to interrupt circuit currents.

If additional diodes are required to protect the FET body diodes, select a Transient Voltage Suppressor (TVS) diode with a breakdown rating lower than that of the driver FET body diode. In general, a higher voltage TVS diode will result in faster contact opening and higher clamping voltage, while a lower voltage TVS diode will result in slower contact opening and lower clamping voltage. For more detailed information regarding TVS diode selection, contact Tyco Electronics and request the report titled DC Relay Magnetic Energy Determination and Transient Voltage suppressor Diode Selection.

1.1 Recommended Operating Frequency and Duty Cycle

The frequency at which the PWM circuit is operated should be high enough such that the oscillation of the coil current does not lead to audible noise being generated by the magnetic components and coil winding. For most KILOVAC contactors, a coil drive frequency > 15 kHz is usually sufficient to ensure that nuisance audible noise is not generated. The PWM duty cycle required for economizing power while maintaining sufficient holding force can be calculated from the required holding current as follows:

\[
\text{Duty Cycle(\%)} = \left( \frac{I_{\text{hold}} \cdot R(T)_{\text{Coil}}}{V_{\text{source}}} \right) \times 100 \tag{1}
\]

Where:
- \(R(T)\) = Coil Resistance at Temperature
- \(I_{\text{hold}}\) = Required Holding Current
- \(V_{\text{source}}\) = Source Voltage

Contact Tyco Electronics regarding the minimum required hold current needed for a particular Part Number. In general, divide the specified dropout voltage by the coil resistance at 20°C, and add 25% above that to get an estimate of the value to use in equation (1) for \(I_{\text{hold}}\).

2.0 Summary

This Application Note is meant to address some of the more common questions regarding the use of PWM circuits for coil power economization. In all cases, please refer to the applicable product data sheet for specific information.

Tyco Electronics can also recommend alternative solutions for mechanical dual-coil economizers, as well as "Electronic Cut-Through" economizers. Product Application Engineers are available to answer questions regarding this subject by calling 800-253-4560 x2055, or 805-220-2055.