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FCB-205 Series, 5 Amperes, DPDT

The Series FCB-205 relay is a polarized single-side stable design, where the flux from a permanent magnet provides the armature holding force in the deactivated state, and its flux path is switched and combined with the coil flux in the operated state. This results in appreciably increased contact pressure in both states over that of a spring return nonpolar design. We also manufacture other forms of the FCB relay:

**FCB-405 — 5 Amp 4PDT Relay**

### Product Facts
- **Hermetically Sealed**
- **All Welded Construction**
- **Balanced Force**
- **Permanent Magnet Drive**
- **Contacts rated low level to 5 Amps VDC and 115/200 VAC 400 Hz, 3 Phase**
- **Weight .54 ounces max. (15.4 grams)**
- **Qualified to M83536/1, /2**

### Contact Rating — Amperes

<table>
<thead>
<tr>
<th>Type of Load</th>
<th>Life (Min.)</th>
<th>28 VDC</th>
<th>115VAC 400 Hz</th>
<th>115/200VAC 400Hz, 3G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistive</td>
<td>100</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Inductive</td>
<td>20</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Motor</td>
<td>100</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

*60 Hz loads rated for 10,000 operations*

Low Level Switching Capability: With contacts operating a load of 10 to 50 microamperes at 10 to 50 millivolts, the contact resistance miss detection level shall be 100 ohms max. Cycling rate is 1 to 12 per second, for 100,000 operations.

**Overload Current** — 20 AMPS DC, 30 AMPS 400Hz

**Rupture Current** — 25 AMPS DC, 40 AMPS 400Hz

**Contact Make Bounce** — 1.0 MILLISECOND AT NOMINAL VOLTAGE

**Max. Contact Drop at 5 Amps** — INITIAL 0.100 VOLTS

**End of Life** — 0.125 VOLTS

### General Specifications
- **Temperature Rating** — 
  -70˚C TO + 125˚C
- **Altitude** — 300,000 Feet
- **Shock** — 2, Y, & X Enclosures — 200 g for 6 ms
  - W & M Enclosures (Stud Mtg.) — 100 g for 6 ms
  - T Enclosure (Socket Mounted in Track) — 50 g for 11 ms
- **Vibration, Sinusoidal** — 2, Y, & X Enclosures — 0.12 DA 10 to 70 Hz, 30 g 70-3000Hz
  - W & M Enclosures (Stud Mtg.) — 0.12 DA 10 to 57 Hz, 20 g 57-3000Hz
  - T Enclosure (Socket Mounted in Track) — 0.06 DA 10 to 57 Hz, 10 g 57 to 500Hz, 20 g 500 to 3000Hz
- **Vibration, Random** — 2, Y, & X Enclosures — 0.4 g/Hz 50-2000Hz
  - T, W & M Enclosures — 0.2 g/Hz 50-2000Hz
- **Dielectric Strength** —
  - At Sea Level — All circuits to ground and circuit to circuit — 1000 V rms
  - Coil to ground — 1000 V rms
  - At 80,000 Feet — 250 V rms
- **Insulation Resistance** —
  - Initial (500 VDC) — 100 MΩ Min.
  - After Life or Environmental Tests — 50 MΩ Min.
- **Operate Time at Nominal Voltage** — 4 ms or less
- **Release Time at Nominal Voltage** — 4 ms or less

*Max. contact opening under vibration or shock 10 microseconds*
Below are shown the standard terminal types and the enclosures available. Specify the assembly as indicated under How To Order. Dimensions are shown in inches ± .010 and (Millimeters ± .25).

**Terminals**

**CODE "A"**
- **Socket Pin Terminals**: Gold plated. Polaring pin/lead plated.
- **Dimensions**: ± .005 (1.27 ± .13) Silicone Rubber Gasket
- ** Socket Pins**: .040 ± .001 Dia Pin (1.02 ± .02) 8 Places
- **Notes**: +X1 BLUE BEAD

**CODE "B"**
- **Solder Pin Terminals**: All Terminals Tin/Lead plated.
- **Dimensions**: ± .002 (1.27 ± .05) polarizing pin
- ** Solder Pin**: .040 ± .002 Dia Pin (1.02 ± .02) 8 Places
- **Notes**: +X1 BLUE BEAD

**CODE "C"**
- **Solder Hook Terminals**: Hook Terminals Tin/Lead Plated.
- **Dimensions**: ± .002 (1.27 ± .05) polarizing pin
- ** Solder Hook**: .040 ± .002 Dia Pin (1.02 ± .02) 8 Places

**CODE "H"**
- **90˚ Solder Pins**: All Pins Bright Acid Tin/Lead.
- **Dimensions**: ± .015 (3.81)
- ** Notes**: -X2 BLU EB EAD

**CODE "T"**
- **Socket Pins**: Gold Plated. Polarizing pin/lead plated. All Terminals Tin/Lead Plated.
- **Dimensions**: ± .005 (1.27 ± .05)
- ** Notes**: -X2 BLU EB EAD

**Enclosures**

All Enclosures have Cupro-Nickel Cans bright acid tin/lead plated after assembly to terminal headers.

Dimensions: Inches ± .010 (mm ± .25)

Enclosure "T" is for use with track mounted sockets and requires socket pin terminals, but no gasket. The gasket is included in the socket assembly.

**CODE "X"**
- **Dimensions**: ± .015 (3.81)
- ** Notes**: + X1 BLU EB EAD

**CODE "Z"**
- **Dimensions**: ± .025 (0.64)
- ** Notes**: FULL R 4 PLCS

**CODE "W"**
- **Dimensions**: ± .080 (2.03 ± .13)
- ** Notes**: 4-40 UNC-2A 2 Studs *

**CODE "T"**
- **Dimensions**: ± .158 (4.01 ± .13)
- ** Notes**: M83536/2-028 (REFERENCE ONLY)

*Metric threads available. To specify use "A" in place of "W"*

NOTE: FOR USE WITH TRACK MOUNT PER MIL-R-6106/23

** ** MEASURED FROM SURFACE OF HEADER

---

5–3

---

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: 956-55-1106-0803

South America: 55-11-2103-6000
Hong Kong: 852-2735-1628
Japan: 81-44-844-8013
UK: 44-8706-080-208
**Terminal Wiring**

**DC Coils**

![DC Coils Diagram]

**Transient Suppression**

![Transient Suppression Diagram]

**NOTE:** Polarity must be observed with DC coil supply. Relay is polarized with a permanent magnet and will not operate or be damaged by reverse polarity. Diodes used in transient suppression and in AC rectifier circuits have peak inverse voltage rating of 600 VDC minimum. Zener diodes have a minimum rating of 1 watt. Terminal designations are for reference only and do not appear on the header.

**HOW TO ORDER**

<table>
<thead>
<tr>
<th>RELAY TYPE</th>
<th>FCB-205-A Y 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>TERMINALS (Socket Pins)</td>
<td></td>
</tr>
<tr>
<td>ENCLOSURE (With Flanges)</td>
<td></td>
</tr>
<tr>
<td>COIL (28 VDC With Transient Suppression)</td>
<td></td>
</tr>
</tbody>
</table>

* The part number example shown on this page is for catalog items. For a list of specific QPL part numbers, please see the index in Section 15.
The Series FCB-405 relay is a polarized single-side stable design, where the flux from a permanent magnet provides the armature holding force in the deactivated state, and its flux path is switched and combined with the coil flux in the operated state. This results in appreciably increased contact pressure in both states over that of a spring return nonpolar design. We also manufacture other versions of this relay:

**FCB-205** — 5 Amp DPDT Relay

### Product Facts
- **Hermetically Sealed**
- **All Welded Construction**
- **Balanced Force**
- **Permanent Magnet Drive**
- **Contacts rated low level to 5 Amps 28 VDC and 115/200 VAC 400 Hz, 3 Phase**
- **Weight** .93 ounces max. (26.4 grams)
- **Qualified to M83536/5 & /6**

### Contact Rating — Amperes
**Ratings Are Continuous Duty**

<table>
<thead>
<tr>
<th>Type of Load</th>
<th>Life (Min.) Cycles x 10³</th>
<th>28 VDC</th>
<th>115VAC 400Hz</th>
<th>115/200VAC 400Hz-3Ø</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistive</td>
<td>100</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Inductive</td>
<td>20</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Motor</td>
<td>100</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lamp</td>
<td>100</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Low Level Switching Capability: With contacts operating a load of 10 to 50 microamperes at 10 to 50 millivolts, the contact resistance miss detection level shall be 100 ohms max. Cycling rate is 1 to 12 per second, for 100,000 operations.

**Overload Current** — 20 AMPS DC, 30 AMPS 400Hz
**Rupture Current** — 25 AMPS DC, 40 AMPS 400Hz
**Contact Make Bounce** — 1.0 MILLISECOND AT NOMINAL VOLTAGE
**Max. Contact Drop at 5 Amps** — INITIAL 0.100 VOLTS
**End of Life** — 0.125 VOLTS

### General Specifications
**Temperature Rating** — -70°C TO +125°C
**Altitude** — 300,000 Feet
**Shock** — Z & Y Enclosures — 30 g 70-3000Hz
W, X & M Enclosures — 20 g 70-3000Hz
T Enclosure (Socket Mounted in Track) — 20 g 500-3000 Hz
**Vibration, Sinusoidal** — Z & Y Enclosures — 0.4 g;Hz 50-2000Hz
T, W, X & M Enclosures — 0.2 g;Hz 50-2000Hz
**Vibration, Random** — Z & Y Enclosures — 400 Hz
**Dielectric Strength** — At Sea Level — All circuits to ground and circuit to circuit — 1000 V ms
Coil to ground — 1000 V ms
At 80,000 Feet — 250 V ms
**Insulation Resistance** — Initial (500 VDC) — 100 MΩ Min. After Life or Environmental Tests — 50 MΩ Min.
**Operate Time at Nominal Voltage** — 6 ms or less
**Release Time at Nominal Voltage** — 6 ms or less

* Max. contact opening under vibration or shock 10 microseconds

### Coil Data

<table>
<thead>
<tr>
<th>Code</th>
<th>Nominal Voltages</th>
<th>Freq. Hz</th>
<th>DC Res. (Ω)</th>
<th>Pickup or Below Volts</th>
<th>Dropout or Above Volts</th>
<th>Must Hold Voltage (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6 DC</td>
<td>25</td>
<td>4.5</td>
<td>0.3</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>12 DC</td>
<td>100</td>
<td>9.0</td>
<td>0.75</td>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>28 DC</td>
<td>400</td>
<td>18.0</td>
<td>1.5</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>4 (A)</td>
<td>28 DC</td>
<td>400</td>
<td>18.0</td>
<td>1.5</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>48 DC</td>
<td>1275</td>
<td>36.0</td>
<td>2.5</td>
<td>14.0</td>
<td></td>
</tr>
</tbody>
</table>

A. CODE 4 COILS HAVE BACK EMF SUPPRESSION TO 42 VOLTS MAX.
B. DC COIL RESISTANCE ± 10% AT 25°C
C. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN.
D. MAX. OVERVOLTAGE: 6 & 12 VDC COILS 120% OF NOMINAL; ALL OTHERS 110% OF NOMINAL.
Below are shown the standard terminal types and the enclosures available. Specify the assembly as indicated under How To Order. Dimensions are shown in inches ± .010 and (Millimeters ± .25).

### Terminals

**CODE "A"**

**Socket Pins - All DC Coils**

PIN TERMINALS ARE GOLD PLATED

- .170 (4.32) ± .000 Dia. Pin
- .040 ± .001 Dia. Pin

**CODE "B"**

**Solder Pin Terminals**

PIN TERMINALS TIN/LEAD PLATED

- .170 (4.32) ± .000 Dia. Pin

**CODE "C"**

**Solder Hook Terminals**

HOOK TERMINALS TIN/LEAD PLATED

- .170 (4.32) ± .000 Dia. Pin

### Enclosures

All Enclosures have cupro-Nickel cans bright acid tin/lead plated after assembly to terminal headers.

Dimensions: Inches ± .010 (mm ± .25)

**CODE "T" used only with track-mounted Sockets. Requires code "A" pin terminals. Gasket is included in the socket assembly.**

**CODE "X"**

**Y**

**Z**

---

**Specifications subject to change.**

Dimensions are shown for reference purposes only.

- 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

---

**Dimensions**

- In inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.
Terminal Wiring

DC Coils

DC Coils with Transient Suppression

NOTE: Polarity must be observed with DC coil supply. Relay is polarized with a permanent magnet and will not operate or be damaged by reverse polarity.

Diodes used in transient suppression and in AC rectifier circuits have peak inverse voltage rating of 600 VDC minimum. Zener diodes have a minimum rating of 1 watt.

Terminal designations are for reference only and do not appear on the header.

HOW TO ORDER

RELAY TYPE

TERMINALS (Socket Pins)

ENCLOSURE (With Flanges)

COIL (28 VDC With Transient Suppression).

* The part number example shown on this page is for catalog items. For a list of specific QPL part numbers, please see the index in Section 15.
CIIMid-Range Relays

FCA-210 Series, 10 Amperes, DPDT

The Series FCA-210 relay is a polarized single-side stable design, where the flux from a permanent magnet provides the armature holding force in the deactivated state, and its flux path is switched and combined with the coil flux in the operated state. This results in appreciably increased contact pressure in both states over that of a spring return nonpolar design. We also manufacture other versions of this relay:

- FCA-410 — 10 Ampere 4PDT Relay
- FCA-610 — 10 Ampere 6 PDT Relay

**Available:**
- FCA-215 — 15 Ampere DPDT Relay, Has the same specifications as the FCA-210 except is rated at 15 amps. (Commercial Only)

**Product Facts**
- Hermetically Sealed
- All Welded Construction
- Balanced Force
- Permanent Magnet Drive
- Contacts — Silver Cadmium Oxide with Gold Plating
- Coils for DC, 50 to 400Hz and 400Hz AC
- Weight 1.6 ounces max. (45.4 grams)
- Qualified to M83536/9, /10

**Contact Rating — Amperes**

Ratings Are Continuous Duty

<table>
<thead>
<tr>
<th>Type of Load</th>
<th>Life (Min.)</th>
<th>28 VDC</th>
<th>115VAC 400Hz</th>
<th>115/200VAC 30 400Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistive</td>
<td>100</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Inductive</td>
<td>20</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Motor</td>
<td>100</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Lamp</td>
<td>100</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

*60 Hz loads rated for 10,000 operations

**Overload Current** — 40 AMPS DC, 60 AMPS 400Hz
**Rupture Current** — 50 AMPS DC, 80 AMPS 400Hz
**Contact Make Bounce** — 1 MILLISECOND AT NOMINAL VOLTAGE
**Max. Contact Drop at 10 Amps** — INITIAL 0.100 VOLTS
**End of Life** — 0.125 VOLTS

**Coil Data**

<table>
<thead>
<tr>
<th>Coil Code</th>
<th>Nominal Voltages</th>
<th>Freq. Hz</th>
<th>DC Res. AC Amps (B)</th>
<th>Pickup or Below Volts</th>
<th>Dropout or Above Volts</th>
<th>Must Hold Voltage (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6 DC</td>
<td>20Ω</td>
<td>4.5</td>
<td>0.3</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>12 DC</td>
<td>80Ω</td>
<td>9.0</td>
<td>0.75</td>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>28 DC</td>
<td>320Ω</td>
<td>18.0</td>
<td>1.5</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>4 (A)</td>
<td>28 DC</td>
<td>320Ω</td>
<td>18.0</td>
<td>1.5</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>48 DC</td>
<td>920Ω</td>
<td>32.0</td>
<td>2.5</td>
<td>14.0</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>28 400Hz</td>
<td>180 mA</td>
<td>22.0</td>
<td>1.25</td>
<td>10.0</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>28 50/400Hz</td>
<td>100 mA</td>
<td>22.0</td>
<td>1.25</td>
<td>10.0</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>115 400 Hz</td>
<td>40 mA</td>
<td>90.0</td>
<td>5.0</td>
<td>40.0</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>115 50/400 Hz</td>
<td>30 mA</td>
<td>95.0</td>
<td>5.0</td>
<td>40.0</td>
<td></td>
</tr>
</tbody>
</table>

A. CODE 4 COILS HAVE BACK EMF SUPPRESSION TO 42 VOLTS MAX.
B. DC COIL RESISTANCE ± 10% AT 25°C; AC COIL MAX. CURRENT AT NOMINAL VOLTAGE.
C. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN.
D. MAX OVERVOLTAGE: 6 & 12 VDC COILS 120% OF NOMINAL, ALL OTHERS 110% OF NOMINAL.
E. COILS AVAILABLE FOR OTHER VOLTAGES AND FOR AC 50/60HZ.

**General Specifications**

- **Temperature Rating** — -70°C TO + 125°C
- **Altitude** — 300,000 Feet
- **Shock** — Z, Y, & X Enclosures — 200 g for 6 mS
- **Vibration, Sinusoidal** — Z, Y, & X Enclosures — 30 g 33-3000Hz
- **DIELECTRIC STRENGTH** — At Sea Level — All circuits to ground and circuit to circuit — 1250 V rms
- **Insulation Resistance** — Initial (500 VDC) — 100 MΩ Min.
- **Operate Time at Nominal Voltage** — DC Relays — 10 ms or less
- **Release Time at Nominal Voltage** — DC Relays — 10 ms or less

NOTE: Only DC Coil Models are QPL Approved.
Below are shown the standard terminal types and the enclosures available. Specify the assembly as indicated under How To Order. Dimensions are shown in inches ± .010 and (Millimeters ± .25).

**Terminals**

**CODE “A”**
Socket Pins - All DC Coils

**CODE “B”**
Circuit Board Pins - All DC Coils

**CODE “C”**
Solder Hook Terminals

**CODE “D”**
Socket Pins 115 VAC

**CODE “E”**
Socket Pins 28 VAC Coils

**CODE “F”**
Circuit Board Pins 115 VAC Coils

**CODE “G”**
Circuit Board Pins 28 VAC Coils

**CODE “H”**
90° Solder Pins

**Enclosures**

All Enclosures have Cupro-Nickel Cans bright acid tin/lead plated after assembly to terminal headers.

Dimensions: Inches ± .010 (mm ± .25)

“A” AC Coils 1.125 in. (28.57) Max.
DC Coils 1.010 in. (25.65) Max.

**CODE “Z”**

**CODE “Y”**

**CODE “X”**

**CODE “W”**

*Metric threads available. To specify use M in place of W*
NOTE: Polarity must be observed with DC coil supply. Relay is polarized with a permanent magnet and will not operate or be damaged by reverse polarity.

Diodes used in transient suppression and in AC rectifier circuits have peak inverse voltage rating of 600 VDC minimum. Zener diodes have a minimum rating of 1 watt.

Terminal designations are for reference only and do not appear on the header.

**HOW TO ORDER**

**FCA-215-**
**FCA-210-A Y 4**

**RELAY TYPE**

**TERMINALS** (Socket Pins, DC Coil)

**ENCLOSURE** (With Flanges)

**COIL** (28 VDC With Transient Suppression).

**NOTE:** Only DC coil models are QPL Approved
FCA-212 Series, 12 Amperes, DPDT

The Series FCA-212 relay is a polarized single-side stable design, where the flux from a permanent magnet provides the armature holding force in the deactivated state, and its flux path is switched and combined with the coil flux in the operated state. This results in appreciably increased contact pressure in both states over that of a spring return nonpolar design. We also manufacture other versions of this relay:

**FCA-412** — 12 Amp 4PDT Relay

### Product Facts
- Hermetically Sealed
- All Welded Construction
- Balanced Force
- Permanent Magnet Drive
- Contacts — Silver Cadmium Oxide with Gold Plating
- Coils for DC, 50 to 400Hz and 400Hz AC
- Weight 1.6 ounces max. (45.4 grams)

### Contact Rating — Amperes

Ratings Are Continuous Duty

<table>
<thead>
<tr>
<th>Type of Load</th>
<th>Life (Min.)</th>
<th>28 VDC</th>
<th>115VAC</th>
<th>115/200VAC</th>
<th>3O 400Hz</th>
<th>400Hz</th>
<th>60Hz*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistive</td>
<td>100</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inductive</td>
<td>20</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor</td>
<td>100</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lamp</td>
<td>100</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*60 Hz loads rated for 10,000 operations

### Overload Current — 40 AMPS DC, 60 AMPS 400Hz

### Rupture Current — 50 AMPS DC, 80 AMPS 400Hz

### Contact Make Bounce — 1 MILLISECOND AT NOMINAL VOLTAGE

### Max. Contact Drop at 12 Amps — INITIAL 0.150 VOLTS

### End of Life — 0.175 VOLTS

### General Specifications

- **Temperature Rating** — -70°C TO +125°C
- **Altitude** — 300,000 Feet
- **Shock** —
  - Z, Y, & X Enclosures — 30 g 33-3000Hz
  - W Enclosure — 20 g 33-3000Hz
- **Vibration, Sinusoidal** —
  - Z, Y, & X Enclosures — 0.4 g/Hz 50-2000Hz
  - W & M Enclosures (Stud Mtg.) — 0.2 g/Hz 50-2000Hz
- **Vibration, Random** —
  - Z, Y, & X Enclosures —
  - W & M Enclosures (Stud Mtg.) —
- **Dielectric Strength** —
  - At Sea Level — All circuits to ground and circuit to circuit — 1250 V rms
  - Coil to ground — 1000 V rms
  - At 80,000 Feet — 350 V rms
- **Insulation Resistance** —
  - Initial (500 VDC) — 100 MΩ Min.
  - After Life or Environmental Tests — 50 MΩ Min.
- **Operate Time at Nominal Voltage** —
  - DC Relays — 10 ms or less
  - AC Relays — 15 ms or less
- **Release Time at Nominal Voltage** —
  - DC Relays — 10 ms or less
  - AC Relays — 50 ms or less

*Max. contact opening under vibration or shock 10 microseconds

### Coil Data

<table>
<thead>
<tr>
<th>Coil Code</th>
<th>Nominal Voltages</th>
<th>Freq. Hz</th>
<th>DC Res. AC Amps (B)</th>
<th>Over Temperature Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>DC</td>
<td>20 Ω</td>
<td>Initial (500 VDC) — 100 MΩ Min.</td>
</tr>
<tr>
<td>2</td>
<td>12</td>
<td>DC</td>
<td>80 Ω</td>
<td>After Life or Environmental Tests — 50 MΩ Min.</td>
</tr>
<tr>
<td>3</td>
<td>28</td>
<td>DC</td>
<td>320 Ω</td>
<td>DC Relays — 10 ms or less</td>
</tr>
<tr>
<td>4 (A)</td>
<td>28</td>
<td>DC</td>
<td>320 Ω</td>
<td>AC Relays — 15 ms or less</td>
</tr>
<tr>
<td>5</td>
<td>48</td>
<td>DC</td>
<td>920 Ω</td>
<td>DC Relays — 10 ms or less</td>
</tr>
<tr>
<td>6</td>
<td>28</td>
<td>400Hz</td>
<td>180 mA</td>
<td>AC Relays — 50 ms or less</td>
</tr>
<tr>
<td>7</td>
<td>28</td>
<td>50/400Hz</td>
<td>100 mA</td>
<td>DC Relays — 10 ms or less</td>
</tr>
<tr>
<td>8</td>
<td>115</td>
<td>400 Hz</td>
<td>40 mA</td>
<td>AC Relays — 50 ms or less</td>
</tr>
<tr>
<td>9</td>
<td>115</td>
<td>50/400Hz</td>
<td>30 mA</td>
<td>DC Relays — 10 ms or less</td>
</tr>
</tbody>
</table>

A. **CODE 4 COILS HAVE BACK EMF SUPPRESSION TO 42 VOLTS MAX.**

B. **DC COIL RESISTANCE ± 10% AT 25°C; AC COIL MAX. CURRENT AT NOMINAL VOLTAGE.**

C. **RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN.**

D. **MAX. OVERVOLTAGE: 6 & 12 VDC COILS 120% OF NOMINAL; ALL OTHERS 110% OF NOMINAL.**

E. **COILS AVAILABLE FOR OTHER VOLTAGES AND FOR AC 50/60Hz.**
Below are shown the standard terminal types and the enclosures available. Specify the assembly as indicated under How To Order. Dimensions are shown in inches ± .010 and (Millimeters ± .25).

**Terminals**

**Code A**

Socket Pins - All DC Coils

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Tolerance</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>.050 ± .005</td>
<td>(1.27 ± .13)</td>
<td>Silicone Rubber Gasket</td>
</tr>
</tbody>
</table>

**Code B**

Circuit Board Pins - All DC Coils

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Tolerance</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>.062 ± .002</td>
<td>(1.57 ± .05)</td>
<td>Polar Pin</td>
</tr>
</tbody>
</table>

**Code C**

Solder Hook Terminals

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Tolerance</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>.062 ± .001</td>
<td>(1.57 ± .02)</td>
<td>8 Plcs</td>
</tr>
</tbody>
</table>

**Code D**

Socket Pins 115 VAC

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Tolerance</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>.270 (6.86)</td>
<td>0.050 ± .005</td>
<td>(1.27 ± .13) Silicone Rubber Gasket</td>
</tr>
</tbody>
</table>

**Code E**

Socket Pins 28 VAC Coils

Same as Code "D" Except polarizing Pin turned 90˚ to this plane.

**Code F**

Circuit Board Pins 115 VAC Coils

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Tolerance</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>.270 (6.86)</td>
<td>0.050 ± .005</td>
<td>(1.27 ± .13) Silicone Rubber Gasket</td>
</tr>
</tbody>
</table>

**Code G**

Socket Pins 28 VAC Coils

Same as Code "D" Except polarizing Pin turned 90˚ to this plane.

**Code H**

90˚ Solder Pins

All Pins Bright Acid Tin/lead

**Enclosures**

All Enclosures have Cupro-Nickel Cans bright acid tin/lead plated after assembly to terminal headers.

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Tolerance</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>.525 Max.</td>
<td>(13.34)</td>
<td>D.C. Coils 1.010 in. (25.65) Max.</td>
</tr>
</tbody>
</table>

Dimensions: Inches ± .010 (mm ± .25)
NOTE: Polarity must be observed with DC coil supply. Relay is polarized with a permanent magnet and will not operate or be damaged by reverse polarity. Diodes used in transient suppression and in AC rectifier circuits have peak inverse voltage rating of 600 VDC minimum. Zener diodes have a minimum rating of 1 watt. Terminal designations are for reference only and do not appear on the header.

FCA-212 Series, 12 Amperes, DPDT (Continued)

Terminal Wiring
DC Coils with Transient Suppression

DC Coils

AC Coils 115 VAC

AC Coils 28 VAC

NOTE: Polarity must be observed with DC coil supply. Relay is polarized with a permanent magnet and will not operate or be damaged by reverse polarity. Diodes used in transient suppression and in AC rectifier circuits have peak inverse voltage rating of 600 VDC minimum. Zener diodes have a minimum rating of 1 watt. Terminal designations are for reference only and do not appear on the header.

HOW TO ORDER

RELAY TYPE

TERMINALS (Socket Pins, DC Coil)

ENCLOSURE (With Flanges)

COIL (28 VDC With Transient Suppression).
CII Mid-Range Relays

FCA-410 Series, 10 Amperes, 4PDT

The Series FCA-410 relay is a polarized single-side stable design, where the flux from a permanent magnet provides the armature holding force in the deactivated state, and its flux path is switched and combined with the coil flux in the operated state. This results in appreciably increased contact pressure in both states over that of a spring return nonpolar design. We also manufacture 2-pole and 6-pole versions of this relay.

**FCA-210 — 10 Amp DPDT Relay**
**FCA-610 — 10 Amp 6PDT Relay**

**Available**
**FCA-415 — 15 Amp 4PDT,** Has the same specifications as the FCA-410 except is rated at 15 amps.

**Product Facts**
- Hermetically Sealed
- All Welded Construction
- Balanced Force
- Permanent Magnet Drive
- 4PDT switching in one inch cube
- Contacts — Silver Cadmium Oxide with Gold Plating
- Coils for DC and AC 50 to 400Hz or 400Hz
- Weight 2.72 ounces max. (77 grams max.)
- Qualified to M83536/15, /16

**Contact Rating — Amperes**

<table>
<thead>
<tr>
<th>Type of Load</th>
<th>Life (Min.) Cycles x 10³</th>
<th>28 VDC 120VAC 400Hz</th>
<th>120/200VAC 400Hz-30 60Hz-30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistive</td>
<td>100</td>
<td>10 x 10</td>
<td>10 x 10 x 2.5</td>
</tr>
<tr>
<td>Inductive</td>
<td>100</td>
<td>10 x 10</td>
<td>10 x 10 x 2.5</td>
</tr>
<tr>
<td>Motor</td>
<td>100</td>
<td>10 x 10</td>
<td>10 x 10 x 2.5</td>
</tr>
<tr>
<td>Lamp</td>
<td>100</td>
<td>2 x 10</td>
<td>2 x 2 x 1.0</td>
</tr>
</tbody>
</table>

*60 Hz loads rated for 10,000 operations

**Overload Current** — 40 AMPS DC, 60 AMPS 400Hz

**Rupture Current** — 50 AMPS DC, 80 AMPS 400Hz

**Contact Make Bounce** — 1 MILLISECOND AT NOMINAL VOLTAGE

**Max. Contact Drop at 10 Amps** — INITIAL 0.100 VOLTS

**End of Life** — 0.125 VOLTS

**General Specifications**

**Temperature Rating** — -70˚C TO + 125˚C
**Altitude** — 300,000 Feet
**Shock** — Z & Y Enclosures — 200 g for 6 mS
W, X & M Enclosures — 100 g for 6 mS

**Vibration, Sinusoidal** — Z & Y Enclosures — 0.12 DA 10 to 70Hz 30 g 70 to 300Hz
W, X & M Enclosures — 0.12 DA 10 to 57Hz 20 g 57 to 300Hz

**Vibration, Random** —
Z & Y Enclosures — 0.4 g/Hz 50-2000Hz
W, X & M Enclosures — 0.2 g/Hz 50-2000Hz

**Dielectric Strength** —
At Sea Level —
All circuits to ground and circuit to circuit — 1250 V ms
Coil to ground — 1000 V ms
At 80,000 Feet — 350 V ms

**Insulation Resistance** —
Initial (500 VDC) — 100 MΩ Min.
After Life or Environmental Tests — 50 MΩ Min.

**Operate Time at Nominal Voltage** — DC Relays — 15 ms or less
AC Relays — 20 ms or less

**Release Time at Nominal Voltage** — DC Relays — 15 ms or less
AC Relays — 50 ms or less

**Coil Data**

<table>
<thead>
<tr>
<th>Coil Code</th>
<th>Nominal Voltages</th>
<th>Freq. Hz</th>
<th>DC Res. AC Amps (B)</th>
<th>Pickup or Below Volts</th>
<th>Dropout or Above Volts</th>
<th>Must Hold Voltage (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6 DC</td>
<td>18 Ω</td>
<td>4.5</td>
<td>0.3</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>12 DC</td>
<td>70 Ω</td>
<td>9.0</td>
<td>0.75</td>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>28 DC</td>
<td>290 Ω</td>
<td>18.0</td>
<td>1.5</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>4 (A)</td>
<td>28 DC</td>
<td>290 Ω</td>
<td>18.0</td>
<td>1.5</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>48 DC</td>
<td>665 Ω</td>
<td>32.0</td>
<td>2.5</td>
<td>14.0</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>28 400Hz</td>
<td>225 mA</td>
<td>22.0</td>
<td>1.25</td>
<td>10.0</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>28 50/400Hz</td>
<td>120 mA</td>
<td>22.0</td>
<td>1.25</td>
<td>10.0</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>115 400 Hz</td>
<td>40 mA</td>
<td>90.0</td>
<td>5.0</td>
<td>40.0</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>115 50/400 Hz</td>
<td>40 mA</td>
<td>95.0</td>
<td>5.0</td>
<td>40.0</td>
<td></td>
</tr>
</tbody>
</table>

A. CODE 4 COILS HAVE BACK EMF SUPPRESSION TO 42 VOLTS MAX.
B. DC COIL RESISTANCE ≤ 10% AT 25˚C; AC COIL MAX. CURRENT AT NOMINAL VOLTAGE.
C. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN.
D. MAX. OVER-VOLTAGE: 6 & 12 VDC COILS 120% OF NOMINAL; ALL OTHERS 110% OF NOMINAL.
E. COILS AVAILABLE FOR OTHER VOLTAGES AND FOR AC 50/60HZ.

**Note:** Only DC Coil Models are QPL Approved.
Below are shown the standard terminal types and the enclosures available. Note that the pin configuration for coil connections is determined by the coil supply voltage. Specify the assembly as indicated under How To Order. Dimensions are shown in inches ± .010 and (Millimeters ± .25) except as noted.

**Terminals**

Terminals on 0.200 centers.
Coil terminals: X1-X2.
Socket Pins are Gold Plated.
Circuit Board Pins are Tin/Lead Plated.

**CODE “A”**

Socket Pins-All DC Coils

**CODE “B”**

Circuit Board Pins-All DC Coils

**CODE “C”**

Solder Hooks-AC or DC Coils

**CODE “D”**

Socket Pins-115 VAC Coils

**Enclosures**

All Enclosures have cupro-Nickel cans bright acid tin/lead plated after assembly to terminal headers.

**CODE “X”**

Socket Pins-115 VAC Coils

**CODE “Y”**

6-32 UNC-2A 3 Studs *

**CODE “Z”**

6-32 UNC-2A 3 Studs *
FCA-410 Series, 10 Amperes, 4PDT (Continued)

Terminals (Continued)

**CODE “E”**
**Socket Pins- 28 VAC Coils**

**CODE “F”**
**Circuit Board Pins-115 VAC Coils**

**CODE “G”**
**Circuit Board Pins- 28 VAC Coils**

Terminal Wiring

**A & B Pin Terminal**
**All DC Coils**

**C Hook Terminal**
**All AC & DC Coils**

**Transient Suppression**
**Cir.**

**D & F Pin Terminal**
**115 VAC Coils**

**E & G Pin Terminal**
**28 VAC Coils**

**NOTE:** Polarity must be observed with DC coil supply. Relay is polarized with a permanent magnet and will not operate or be damaged by reverse polarity.

Diodes used in transient suppression and in AC rectifier circuits have peak inverse voltage rating of 600 VDC minimum. Zener diodes have a minimum rating of 1 watt.

Terminal designations are for reference only and do not appear on the header.

**HOW TO ORDER**

**RELAY TYPE**

**TERMINALS (Socket Pins)**

**ENCLOSURE (With Flanges)**

**COIL (28 VDC With Transient Suppression).**

**NOTE:** Only DC coil models are QPL Approved

* The part number example shown on this page is for catalog items. For a list of specific QPL part numbers, please see the index in Section 15.
CII Mid-Range Relays

FCA-610 Series, 10 Amperes, 6PDT

The Series FCA-610 relay is a polarized single-side stable design, where the flux from a permanent magnet provides the armature holding force in the deactivated state, and its flux path is switched and combined with the coil flux in the operated state. This results in appreciably increased contact pressure in both states over that of a spring return nonpolar design. We also manufacture 2-pole and 4-pole versions of this relay.

FCA-210 — 10 Amp DPDT Relay  
FCA-410 — 10 Amp 4PDT Relay

Product Facts

- Hermetically Sealed  
- All Welded Construction  
- Balanced Force  
- Permanent Magnet Drive  
- 6PDT Switching in 1.4 Cu Inch  
- Contacts — Silver Cadmium Oxide with Gold Plating  
- Coils for DC and 400Hz  
- Weight 4.16 ounces max. (117.94 grams max.)

Contact Rating — Amperes  
Ratings Are Continuous Duty

<table>
<thead>
<tr>
<th>Type of Load</th>
<th>Life (Min.)</th>
<th>28 VDC</th>
<th>115 VAC 400 Hz</th>
<th>115 VAC 400 Hz-3Ø</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistive</td>
<td>100</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Inductive</td>
<td>20</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Motor</td>
<td>100</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Lamp</td>
<td>100</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

*60 Hz loads rated for 10,000 operations

Overload Current — 40 AMPS DC, 60 AMPS 400Hz  
Rupture Current — 50 AMPS DC, 80 AMPS 400Hz  
Contact Make Bounce — 1 MILLISECOND AT NOMINAL VOLTAGE  
Max. Contact Drop at 25 Amps — INITIAL 0.100 VOLTS  
End of Life — 0.125 VOLTS

General Specifications

Temperature Rating — -70°C TO +125°C  
Altitude — 300,000 Feet  
Shock* — Z, Y, & X Enclosures — 50 g for 6 to 9 mS  
Vibration, Sinusoidal* — Z, Y, & X Enclosures — 20 g to 2000Hz  
Vibration, Random* — Z, Y, & X Enclosures — 0.3 g/Hz 50-2000Hz  
Dielectric Strength — At Sea Level — All circuits to ground and circuit to circuit — 1250 V rms  
Coil to ground — 1000 V rms  
At 80,000 Feet — 350 V rms  
Insulation Resistance — Initial (500 VDC) — 100 MΩ Min.  
After Life or Environmental Tests — 50 MΩ Min.  
Operate Time at Nominal Voltage — DC Relays — 15 ms or less  
AC Relays — 20 ms or less  
Release Time at Nominal Voltage — DC Relays — 15 ms or less  
AC Relays — 50 ms or less

* Max. contact opening under vibration or shock 10 microseconds

Coil Data

<table>
<thead>
<tr>
<th>Coil Code</th>
<th>Nominal Voltages</th>
<th>Freq. Hz</th>
<th>DC Res. AC Amps (B)</th>
<th>Pickup or Below Volts</th>
<th>Dropout or Above Volts</th>
<th>Must Hold Voltage (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>DC</td>
<td>8.5 Ω</td>
<td>4.5</td>
<td>0.3</td>
<td>2.5</td>
</tr>
<tr>
<td>2</td>
<td>12</td>
<td>DC</td>
<td>33 Ω</td>
<td>9.0</td>
<td>0.75</td>
<td>4.5</td>
</tr>
<tr>
<td>3</td>
<td>28</td>
<td>DC</td>
<td>180 Ω</td>
<td>18.0</td>
<td>1.5</td>
<td>7.0</td>
</tr>
<tr>
<td>4 (A)</td>
<td>28</td>
<td>DC</td>
<td>180 Ω</td>
<td>18.0</td>
<td>1.5</td>
<td>7.0</td>
</tr>
<tr>
<td>5</td>
<td>48</td>
<td>DC</td>
<td>530 Ω</td>
<td>32.0</td>
<td>2.5</td>
<td>14.0</td>
</tr>
<tr>
<td>8</td>
<td>115</td>
<td>400 Hz</td>
<td>60 mA</td>
<td>90.0</td>
<td>5.0</td>
<td>40.0</td>
</tr>
</tbody>
</table>

A. CODE 4 COILS HAVE BACK EMF SUPPRESSION TO 42 VOLTS MAX.  
B. DC COIL RESISTANCE ± 10% AT 25°C; AC COIL MAX. CURRENT AT NOMINAL VOLTAGE.  
C. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN.  
D. MAX. OVERVOLTAGE: 6 & 12 VDC COILS 120% OF NOMINAL; ALL OTHERS 110% OF NOMINAL.  
E. COILS AVAILABLE FOR OTHER VOLTAGES AND FOR AC 50/60HZ.
Below are shown the standard terminal types and the enclosures available. Note that the pin configuration for coil connections is determined by the coil supply voltage. Specify the assembly as indicated under How To Order. Dimensions are shown in inches ±.010 and (Millimeters ± .25) except as noted.

**Terminals**
Terminals on 0.200 centers.
Coil terminals: X1-X2.
Socket Pins are Gold Plated.
Circuit Board Pins are Tin/Lead Plated.

**CODE “A”**
**Socket Pins-All DC Coils**

**CODE “C”**
**Solder Hooks-AC or DC Coils**

**CODE “D”**
**Socket Pins-All AC Coils**

**CODE “F”**
**Circuit Board Pins-All AC Coils**

**Enclosures**
All Enclosures have cupro-Nickel cans bright acid tin/lead plated after assembly to terminal headers.

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.
Terminal Wiring

- **All DC Coils & AC Solder Hooks**
- **DC Coils With Transient Suppression**
- **AC Coils (Socket Pins)**

### NOTE:
- Polarity must be observed with DC coil supply. Relay is polarized with a permanent magnet and will not operate or be damaged by reverse polarity.
- Diodes used in transient suppression and in AC rectifier circuits have peak inverse voltage rating of 600 VDC minimum. Zener diodes have a minimum rating of 1 watt.
- Terminal designations are for reference only and do not appear on the header.

### HOW TO ORDER

**RELAY TYPE**

**TERMINALS** (Socket Pins DC Coils)

**ENCLOSURE** (With Flanges)

**COIL** (28 VDC With Transient Suppression)

**FCA-610-A Y 4**
CIIMid-Range Relays

FCA-125 Series, 25 Amperes, SPDT

The Series FCA-125 relay is a polarized single-side stable design, where the flux from a permanent magnet provides the armature holding force in the deactivated state, and its flux path is switched and combined with the coil flux in the operated state.

This results in appreciably increased contact pressure in both states over that of a spring return nonpolar design. We also manufacture other versions of this relay:

- FCA-325 — 25 Ampere 3PDT Relay
- FCAC-325 — 25 Ampere 3PST-NO Relay with 2 amp SPDT auxiliary

Product Facts
- Hermetically Sealed
- All Welded Construction
- Balanced Force
- Permanent Magnet Drive
- Contacts — Silver Cadmium Oxide with Gold Plating
- Coils for DC, 50 to 400Hz and 400Hz AC
- Weight 1.6 ounces max. (45.4 grams)
- Qualified to M6106/19, M83558/36, /37

Contact Rating — Amperes
Ratings Are Continuous Duty

<table>
<thead>
<tr>
<th>Type of Load</th>
<th>Life (Min.)</th>
<th>28 VDC</th>
<th>115VAC 400Hz</th>
<th>115VAC 60Hz*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistive</td>
<td>50</td>
<td>25</td>
<td>25</td>
<td>10</td>
</tr>
<tr>
<td>Inductive</td>
<td>10</td>
<td>12</td>
<td>—</td>
<td>10</td>
</tr>
<tr>
<td>Inductive</td>
<td>20</td>
<td>—</td>
<td>15</td>
<td>—</td>
</tr>
<tr>
<td>Motor</td>
<td>50</td>
<td>10</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Lamp</td>
<td>50</td>
<td>5</td>
<td>5</td>
<td>—</td>
</tr>
</tbody>
</table>

*60 Hz loads rated for 10,000 operations

Overload Current — 50 AMPS DC, 80 AMPS 400Hz
Rupture Current — 60 AMPS DC, 100 AMPS 400Hz
Contact Make Bounce — 1 MILLISECOND AT NOMINAL VOLTAGE
Max. Contact Drop at 25 Amps — INITIAL 0.150 VOLS
End of Life — 0.175 VOLT

General Specifications
- Temperature Rating — -70˚C TO +125˚C
- Altitude — 300,000 Feet
- Shock* — Z, Y, & X Enclosures — 200 g for 6 ms
- Vibration, Sinusoidal* — Z, Y, & X Enclosures — 30 g 33-300Hz
- Vibration, Random* — Z, Y, & X Enclosures — 0.4 g/Hz 50-2000Hz
- Dielectric Strength — At Sea Level — All circuits to ground and circuit to circuit — 1250 V rms
- Insulation Resistance — Initial (500 VDC) — 100 MΩ Min.
- Operate Time at Nominal Voltage — DC Relays — 10 ms or less
- Release Time at Nominal Voltage — DC Relays — 10 ms or less

Coil Data

<table>
<thead>
<tr>
<th>Coil Code</th>
<th>Nominal Voltages</th>
<th>Freq. Hz</th>
<th>DC Res. 40Hz AC Amps (B)</th>
<th>Pickup or Below Volts</th>
<th>Over Temperature Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Must Hold Voltage (C)</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
<td>DC</td>
<td>20 Ω</td>
<td>4.5</td>
<td>2.5</td>
</tr>
<tr>
<td>2</td>
<td>12</td>
<td>DC</td>
<td>80 Ω</td>
<td>9.0</td>
<td>4.5</td>
</tr>
<tr>
<td>3</td>
<td>28</td>
<td>DC</td>
<td>320 Ω</td>
<td>18.0</td>
<td>7.0</td>
</tr>
<tr>
<td>4 (A)</td>
<td>28</td>
<td>DC</td>
<td>320 Ω</td>
<td>18.0</td>
<td>7.0</td>
</tr>
<tr>
<td>5</td>
<td>48</td>
<td>DC</td>
<td>920 Ω</td>
<td>32.0</td>
<td>14.0</td>
</tr>
<tr>
<td>6</td>
<td>28</td>
<td>400Hz</td>
<td>180 mA</td>
<td>22.0</td>
<td>10.0</td>
</tr>
<tr>
<td>7</td>
<td>28</td>
<td>50/400Hz</td>
<td>100 mA</td>
<td>22.0</td>
<td>10.0</td>
</tr>
<tr>
<td>8</td>
<td>115</td>
<td>400 Hz</td>
<td>40 mA</td>
<td>90.0</td>
<td>40.0</td>
</tr>
<tr>
<td>9</td>
<td>115</td>
<td>50/400 Hz</td>
<td>30 mA</td>
<td>95.0</td>
<td>40.0</td>
</tr>
</tbody>
</table>

A. CODE 4 COILS HAVE BACK EMF SUPPRESSION TO 42 VOLTS MAX.
B. DC COIL RESISTANCE ± 10% AT 25˚C; AC COIL MAX. CURRENT AT NOMINAL VOLTAGE.
C. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN.
D. MAX. OVERTENSION: 6 & 12 VDC COILS 120% OF NOMINAL; ALL OTHERS 110% OF NOMINAL.
E. COILS AVAILABLE FOR OTHER VOLTAGES AND FOR AC 50/60Hz.

NOTE: Only DC Coil Models are QPL Approved.
FCA-125 Series, 25 Amperes, SPDT (Continued)

Below are shown the standard terminal types and the enclosures available. Specify the assembly as indicated under How To Order. Dimensions are shown in inches ± .010 and (Millimeters ± .25).

**Terminals**

**Enclosures**
Terminal Wiring

**DC COILS**

![DC COILS Diagram](image)

**DC COILS WITH TRANSIENT SUPPRESSION**

![DC COILS with Transient Suppression Diagram](image)

**AC COILS**

![AC COILS Diagram](image)

**NOTE:** Polarity must be observed with DC coil supply. Polarity is polarized with a permanent magnet and will not operate or be damaged by reverse polarity.

Diodes used in transient suppression and in AC relays circuits have peak inverse voltage rating of 500 Vac minimum. Zener diodes have a minimum rating of 1 watt.

Terminal designations are for reference only and do not appear on the header.

---

**HOW TO ORDER**

<table>
<thead>
<tr>
<th>RELAY TYPE</th>
<th>TERMINALS (Socket Pins, DC Coil)</th>
<th>ENCLOSURE (With Flanges)</th>
<th>COIL (28 VDC With Transient Suppression)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FCA-125-A Y 4</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** Only DC coil models are QPL Approved

* The part number example shown on this page is for catalog items. For a list of specific QPL part numbers, please see the index in Section 15.
CIIMid-Range Relays

FCA-325 Series, 25 Amperes, 3PDT

The Series FCA-325 relay is a polarized single-side stable design, where the flux from a permanent magnet provides the armature holding force in the deactivated state, and its flux path is switched and combined with the coil flux in the operated state. This results in appreciably increased contact pressure in both states over that of a spring return nonpolar design. We also manufacture other versions of this relay:

- **FCA-125** — 25 Amp SPDT Relay
- **FCAC-325** — 25 Ampere 3PST-NO Relay with 2 amp SPDT auxiliary

### Product Facts

- Hermetically Sealed
- All Welded Construction
- Balanced Force
- Permanent Magnet Drive
- Contacts — Silver Cadmium Oxide with Gold Plating
- Coils for DC, 50 to 400Hz and 400Hz AC
- Weight 2.89 ounces max. (82 grams)
- Qualified to M83536/32, /33

### General Specifications

- **Temperature Rating** — -70˚C to +125˚C
- **Altitude** — 300,000 Feet
- **Shock** — Z, Y, & V Enclosures — 200 g for 6 mS
- **Vibration, Sinusoidal** — Z, Y, & V Enclosures — 30 g 33-3000Hz
- **Weight** — 20 g 33-3000Hz
- **Weight** — 50 g for 6 mS
- **Vibration, Random** — Z, Y, & V Enclosures — 0.4 g/Hz 50-2000Hz
- **Weight** — 0.2 g/Hz 50-2000Hz
- **Dielectric Strength** — All circuits to ground and circuit to circuit — 1250 V rms
- **Weight** — 1000 V rms
- **Operate Time at Nominal Voltage** — DC Relays — 15 ms or less
- **Rupture Current** — 100 Amps DC 50/400Hz
- **Contact Make Bounce** — 1 MILLISECOND AT NOMINAL VOLTAGE
- **Release Time at Nominal Voltage** — DC Relays — 20 ms or less
- **Max. Contact Drop at 25 Amps** — INITIAL 0.150 VOLTS
- **End of Life** — 0.175 VOLTS

### Contact Rating — Amperes

### Ratings Are Continuous Duty

<table>
<thead>
<tr>
<th>Type of Load</th>
<th>Life (Min.)</th>
<th>Cycles x 10^3</th>
<th>28 VDC</th>
<th>115VAC 400Hz</th>
<th>115/200VAC 400Hz-3Ø 60Hz-3Ø</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistive</td>
<td>50</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>2.5</td>
</tr>
<tr>
<td>Inductive</td>
<td>10</td>
<td>12</td>
<td>—</td>
<td>—</td>
<td>2.5</td>
</tr>
<tr>
<td>Inductive</td>
<td>20</td>
<td>—</td>
<td>15</td>
<td>15</td>
<td>—</td>
</tr>
<tr>
<td>Motor</td>
<td>50</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>2.0</td>
</tr>
<tr>
<td>Lamp</td>
<td>50</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>1.0</td>
</tr>
</tbody>
</table>

*60 Hz loads rated for 10,000 operations

### Overload Current

- 50 AMPS DC, 80 AMPS 400Hz

### Rupture Current

- 60 AMPS DC, 100 AMPS 400Hz

### Contact Make Bounce

- 1 MILISECOND AT NOMINAL VOLTAGE

### Max. Contact Drop at 25 Amps

- INITIAL 0.150 VOLTS

### End of Life

- 0.175 VOLTS

### Coil Data

<table>
<thead>
<tr>
<th>Coil Code</th>
<th>Nominal Voltages</th>
<th>Freq. Hz</th>
<th>DC Res. AC Amps (B)</th>
<th>Pickup or Below Volts</th>
<th>Dropout or Above Volts</th>
<th>Must Hold Voltage (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>DC</td>
<td>18 Ω</td>
<td>4.5</td>
<td>0.3</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>DC</td>
<td>70 Ω</td>
<td>9.0</td>
<td>0.75</td>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>DC</td>
<td>290 Ω</td>
<td>18.0</td>
<td>1.5</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>28 (A)</td>
<td>DC</td>
<td>290 Ω</td>
<td>18.0</td>
<td>1.5</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>DC</td>
<td>865 Ω</td>
<td>32.0</td>
<td>2.5</td>
<td>14.0</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>400Hz</td>
<td>225 mA</td>
<td>22.0</td>
<td>1.25</td>
<td>10.0</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>50/400Hz</td>
<td>120 mA</td>
<td>22.0</td>
<td>1.25</td>
<td>10.0</td>
<td></td>
</tr>
<tr>
<td>115</td>
<td>400 Hz</td>
<td>40 mA</td>
<td>90.0</td>
<td>5.0</td>
<td>40.0</td>
<td></td>
</tr>
<tr>
<td>115</td>
<td>50/400Hz</td>
<td>30 mA</td>
<td>95.0</td>
<td>5.0</td>
<td>40.0</td>
<td></td>
</tr>
</tbody>
</table>

A. CODE 4 COILS HAVE BACK EMF SUPPRESSION TO 42 VOLTS MAX.
B. DC COIL RESISTANCE ± 10% AT 25˚C; AC COIL MAX. CURRENT AT NOMINAL VOLTAGE.
C. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN.
D. MAX. OVER-VOLTAGE: 6 & 12 VDC COILS 120% OF NOMINAL; ALL OTHERS 110% OF NOMINAL.
E. COILS AVAILABLE FOR OTHER VOLTAGES AND FOR AC 50/60Hz.

### NOTE:

Only DC Coil Models are QPL Approved.
Below are shown the standard terminal types and the enclosures available. Specify the assembly as indicated under How To Order. Dimensions are shown in inches ± .010 and (Millimeters ± .25).

**Terminals**

**CODE “A”**  
Socket Pins - All DC Coils  
PIN TERMINALS ARE GOLD PLATED  

**CODE “B”**  
Solder Pin Terminals  
PIN TERMINALS TIN/LEAD PLATED  

**CODE “C”**  
Solder Hook Terminals  
HOOK TERMINALS TIN/LEAD PLATED  

**Enclosures**

All Enclosures have cupro-Nickel cans bright acid tin/lead plated after assembly to terminal headers.  
Dimensions: Inches ± .010 (mm ± .25)  
For socket pin terminals: specify “Y” enclosures with DC coils and “V” enclosures with AC coils.

**CODE “X”**  

**CODE “W”**  

*Metric threads available. To specify use M in place of W*
**NOTE:** Polarity must be observed with DC coil supply. Relay is polarized with a permanent magnet and will not operate or be damaged by reverse polarity.

Diodes used in transient suppression and in AC rectifier circuits have peak inverse voltage rating of 600 VDC minimum. Zener diodes have a minimum rating of 1 watt.

Terminal designations are for reference only and do not appear on the header.

### HOW TO ORDER

**RELAY TYPE**

**TERMINALS** (Socket Pins, DC Coil)

**ENCLOSURE** (With Flanges)

**COIL** (28 VDC With Transient Suppression).

**NOTE:** Only DC coil models are QPL Approved

* The part number example shown on this page is for catalog items. For a list of specific QPL part numbers, please see the index in Section 15.
FCAC-325 Series, 25 Amperes, 3PST-NO with 2 Amp SPDT Auxiliary Contacts

The Series FCAC-325 relay is a polarized single-side stable design, where the flux from a permanent magnet provides the armature holding force in the deactivated state, and its flux path is switched and combined with the coil flux in the operated state. This results in appreciably increased contact pressure in both states over that of a spring return nonpolar design. We also manufacture other versions of this relay:

- **FCA-125** — 25 Ampere SPDT Relay
- **FCA-325** — 25 Ampere DPDT Relay

### Product Facts
- Hermetically Sealed
- All Welded Construction
- Balanced Force
- Permanent Magnet Drive
- Contacts — Silver Cadmium Oxide with Gold Plating
- Coils for DC, 50 to 400Hz and 400Hz AC
- Weight 2.89 ounces max. (82grams)

### Contact Rating — Amperes

<table>
<thead>
<tr>
<th>Type of Load</th>
<th>Life (Min.) Cycles x10⁴</th>
<th>28 VDC Main</th>
<th>115VAC 400Hz Main</th>
<th>115/200VAC 400Hz-3Ø Main</th>
<th>115/200VAC 60Hz-3Ø Main</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistive</td>
<td>50</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Inductive</td>
<td>10</td>
<td>12</td>
<td>1</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Inductive</td>
<td>20</td>
<td>—</td>
<td>15</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Motor</td>
<td>50</td>
<td>10</td>
<td>—</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Lamp</td>
<td>50</td>
<td>5</td>
<td>.5</td>
<td>.5</td>
<td>.5</td>
</tr>
</tbody>
</table>

*60 Hz loads rated for 10,000 operations

**Overload Current** — 50 AMPS DC, 80 AMPS 400Hz

**Rupture Current** — 60 AMPS DC, 100 AMPS 400Hz.

**Contact Make Bounce** — 1 MILLISECOND AT NOMINAL VOLTAGE

**Auxiliary Contact Bounce** — 4 MILLISECONDS MAX.

**Max. Contact Drop at 25 Amps** — INITIAL 0.150 VOLTS

**End of Life** — 0.175 VOLTS

### Coil Data

<table>
<thead>
<tr>
<th>Coil Code</th>
<th>Nominal Voltages</th>
<th>Freq. Hz</th>
<th>DC Res. AC Amps (B)</th>
<th>Pickup or Above Volts</th>
<th>Over Temperature Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6.0 DC</td>
<td>18 Ω</td>
<td></td>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>12.0 DC</td>
<td>70 Ω</td>
<td></td>
<td>9.0</td>
<td>0.75</td>
</tr>
<tr>
<td>3</td>
<td>28.0 DC</td>
<td>290 Ω</td>
<td></td>
<td>18.0</td>
<td>1.5</td>
</tr>
<tr>
<td>4 (A)</td>
<td>28.0 DC</td>
<td>290 Ω</td>
<td></td>
<td>18.0</td>
<td>1.5</td>
</tr>
<tr>
<td>5</td>
<td>48.0 DC</td>
<td>865 Ω</td>
<td></td>
<td>32.0</td>
<td>2.5</td>
</tr>
<tr>
<td>6</td>
<td>28.0 400Hz</td>
<td>225 mA</td>
<td></td>
<td>22.0</td>
<td>1.25</td>
</tr>
<tr>
<td>7</td>
<td>28.0 50/400Hz</td>
<td>120 mA</td>
<td></td>
<td>22.0</td>
<td>1.25</td>
</tr>
<tr>
<td>8</td>
<td>115.0 400Hz</td>
<td>40 mA</td>
<td></td>
<td>90.0</td>
<td>5.0</td>
</tr>
<tr>
<td>9</td>
<td>115.0 50/60Hz</td>
<td>30 mA</td>
<td></td>
<td>95.0</td>
<td>5.0</td>
</tr>
</tbody>
</table>

A. CODE 4 COILS HAVE BACK EMF SUPPRESSION TO 42 VOLTS MAX.

B. DC COIL RESISTANCE ±10% AT 25°C; AC COIL MAX. CURRENT AT NOMINAL VOLTAGE. CURRENT AT NOMINAL VOLTAGE. CURRENT AT NOMINAL VOLTAGE. CURRENT AT NOMINAL VOLTAGE. CURRENT AT NOMINAL VOLTAGE. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGES SHOWN. RELAY WILL STAY IN PICKED-UP STATE DOWN TO MUST HOLD VOLTAGE (C)
Below are shown the standard terminal types and the enclosures available. Specify the assembly as indicated under How To Order. Dimensions are shown in inches ± .010 and (Millimeters ± .25).

### Terminals

<table>
<thead>
<tr>
<th>CODE</th>
<th>Description</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Socket Pin Terminals Gold Plated</td>
<td>± .010 (± .25)</td>
</tr>
<tr>
<td>B</td>
<td>Solder Pin Terminals Tin/Lead Plated</td>
<td>± .010 (± .25)</td>
</tr>
<tr>
<td>C</td>
<td>Solder Hook Terminals Tin/Lead Plated</td>
<td>± .010 (± .25)</td>
</tr>
</tbody>
</table>

### ENCLOSURES

All Enclosures have cupro-Nickel cans bright acid tin/lead plated after assembly to terminal headers.

Dimensions: Inches ± .010 (mm ± .25)

For socket pin terminals: specify "Y" enclosures with DC coils and "V" enclosures with AC coils.

<table>
<thead>
<tr>
<th>CODE</th>
<th>Description</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>V</td>
<td>&quot;V&quot; enclosures with DC coils</td>
<td>± .010 (± .25)</td>
</tr>
<tr>
<td>Y</td>
<td>&quot;Y&quot; enclosures with AC coils</td>
<td>± .010 (± .25)</td>
</tr>
</tbody>
</table>

---

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: 44-8706-080-208

---
**Terminal Wiring**

**DC COILS**

1. X1
2. X2
3. A
4. B
5. C

**DC COILS WITH TRANSIENT SUPPRESSION**

1. X1
2. X2
3. A
4. B
5. C

**AC COILS**

1. X1
2. X2
3. A
4. B
5. C

**NOTE:** Polarity must be observed with DC coil supply. Relay is polarized with a permanent magnet and will not operate or be damaged by reverse polarity.

Diodes used in transient suppression and in AC rectifier circuits have peak inverse voltage rating of 600 VDC minimum. Zener diodes have a minimum rating of 1 watt.

Terminal designations are for reference only and do not appear on the header.

**HOW TO ORDER**

**RELAY TYPE**

**TERMINALS** (Socket Pins, DC Coil)

**ENCLOSURE** (With Flanges and DC Coil)

**COIL** (28 VDC With Transient Suppression)
FCA-150 Series, 50 Amps, 1PST/NO (DM) Relay

Product Facts
- Non-latching relay
- Balanced force design
- Corrosion protected metal enclosure
- All welded hermetically sealed enclosure occupies about 1 in³ (16.4 cm³)
- 1 Form X (SPST-NO-DM)
- 6, 12 and 28 Vdc coils
- Weight: 90 grams
- Designed and built in accordance to MIL-PRF-6106

The FCA-150 series relay is a polarized, single-side stable design, where the flux from a permanent magnet provides the armature holding force in the deactivated state, and its flux path is switched and combined with the coil flux in the operated state. This results in appreciably increased contact pressure in both states over that of a spring return non-polar design.

Specifications

Contact Data

<table>
<thead>
<tr>
<th>Contact Form</th>
<th>1 Form X (SPST-NO-DM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Rating in Amps (Continuous Duty)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of Load</th>
<th>Life (Min.)</th>
<th>28 Vdc</th>
<th>115 Vac 400Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistive</td>
<td>50,000</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Inductive (L/R=5ms)</td>
<td>20,000</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Motor</td>
<td>20,000</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>None</td>
<td>100,000</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

Overload Current (Resistive) 200 A, 50 cycles
Max. Contact Drop at 10A Initial 150mV; After Life 175mV
Operate Time at Nominal Voltage 15ms Release Time 15ms Bounce Time 1ms

Coil Data

<table>
<thead>
<tr>
<th>Coil Code</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Operating Voltage (Vdc)</td>
<td>6</td>
<td>12</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>Maximum Operating Voltage (Vdc)</td>
<td>7.3</td>
<td>14.5</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td>Maximum Pick-Up Voltage at +125°C</td>
<td>4.5</td>
<td>9</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Maximum Pick-Up Voltage at +125°C, continuous current test (Vdc)</td>
<td>5.7</td>
<td>11.25</td>
<td>22.5</td>
<td>22.5</td>
</tr>
<tr>
<td>Drop-Out Voltage at +125°C</td>
<td>0.3 – 2.5</td>
<td>0.75 – 4.5</td>
<td>1.5 – 7.0</td>
<td>1.5 – 7.0</td>
</tr>
<tr>
<td>Maximum Coil Current at +25°C (mA)</td>
<td>.50</td>
<td>.26</td>
<td>.15</td>
<td>.15</td>
</tr>
<tr>
<td>Back EMF Suppressed to (Vdc)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>-42</td>
</tr>
<tr>
<td>Coil Resistance</td>
<td>18Ω</td>
<td>70Ω</td>
<td>290Ω</td>
<td>290Ω</td>
</tr>
</tbody>
</table>
FCA-150 Series, 50 Amps, 1PST/NO (DM) Relay (Continued)

Specifications

Electrical Data

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Insulation Resistance (note 1)</td>
<td>100 megohms, minimum, at 500Vdc, between each pin and case</td>
</tr>
<tr>
<td>Insulation Resistance After Life or Environmental Test (note 1)</td>
<td>50 megohms, minimum, at 500Vdc, between each pin and case</td>
</tr>
<tr>
<td>Dielectric Strength At Sea Level</td>
<td></td>
</tr>
<tr>
<td>Contacts to Ground and Between Contacts</td>
<td>1,250 Vrms, 60 Hz.</td>
</tr>
<tr>
<td>Coil to Ground</td>
<td>1,000 Vrms, 60 Hz.</td>
</tr>
<tr>
<td>Dielectric Strength at 80,000 ft (25,000m), All Points (note 4)</td>
<td>500 Vrms, 60 Hz.</td>
</tr>
</tbody>
</table>

Environmental Data

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient Temperature Range, Operating</td>
<td>-70°C to +125°C</td>
</tr>
<tr>
<td>Altitude</td>
<td>300,000 feet</td>
</tr>
<tr>
<td>Shock Resistance</td>
<td>50 G’s, 11 ms.</td>
</tr>
<tr>
<td>Vibration Resistance, Sinusoidal</td>
<td>20 G’s, 75-3000Hz.</td>
</tr>
</tbody>
</table>

Mechanical Data

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approximate Weight</td>
<td>3.2 oz. (90g) Max.</td>
</tr>
</tbody>
</table>

NOTES

1. All wired terminals must be connected together during this test. Dielectric withstanding voltage and insulation resistance are measured between all mutually insulated wired terminals and between all these terminals and case.

Terminals

CODE “B”

- CODE “C”

- CODE “K”

Solder Pin Terminals
Tin/Lead Plated

Solder Hook Terminals
Tin/Lead Plated

Terminal Shield

GOLD PIN TERMINALS FOR MIL-C-39029/22B 192 SOCKET PINS
Outline Dimensions

The standard terminal types and enclosures are illustrated below with dimensions in inches ± 0.010 and (millimeters ± 0.25).

Enclosures

**CODE "U"**

**CODE "Y"**

**CODE "X"**

**CODE "R"**

**CODE "Z"**
Terminal Wiring

DC Coils

DC Coils with Transient Suppression

NOTE: Polarity must be observed with DC coil supply. Relay is polarized with a permanent magnet and will not operate or be damaged by reverse polarity.

Diodes used in transient suppression and in AC rectifier circuits have peak inverse voltage rating of 600 VDC minimum. Zener diodes have a minimum rating of 1 watt.

Terminal designations are for reference only and do not appear on the header.

How to Order

Typical Part Number | FCA-150 | -A | Y | 3
--- | --- | --- | --- | ---
Series and Contact Arrangement: FCA-150 = Relay with 1 Form X Main Contacts

Terminals (see drawings for details):
- B = Solder Pin Coil Terminals, Stud Power Terminals
- C = Solder Hook Coil Terminals, Stud Power Terminals
- K = Terminal Block, Stud Power Terminals

Enclosure (see drawings for details):
- R = Horizontal Flange Mount, Rotated
- U = Flush Vertical Flange Mount
- X = Horizontal Flange Mount
- Y = Raised Vertical Flange Mount
- Z = No Mount

Coil:
- 1 = 6Vdc nominal
- 2 = 12Vdc nominal
- 3 = 28Vdc nominal
- 4 = 28Vdc nominal, with back EMF suppression
The FCAC-150 series relay is a polarized, single-side stable design, where the flux from a permanent magnet provides the armature holding force in the deacti-vated state, and its flux path is switched and combined with the coil flux in the operated state. This results in appreciably increased contact pressure in both states over that of a spring return non-polar design.

Specifications

Auxiliary Contact Data

<table>
<thead>
<tr>
<th>Contact Rating in Amps (Continuous Duty)</th>
<th>1 Form X (SPDT-NO-DM) with 1 Form C (SPDT) Auxiliary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Load</td>
<td>Life (Min.)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistive</td>
<td>50,000</td>
</tr>
<tr>
<td>Inductive (L/R=5ms)</td>
<td>20,000</td>
</tr>
<tr>
<td>Motor</td>
<td>20,000</td>
</tr>
<tr>
<td>None</td>
<td>100,000</td>
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</table>

Coil Data

<table>
<thead>
<tr>
<th>Coil Code</th>
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<th>2</th>
<th>3</th>
<th>4(A)</th>
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<tbody>
<tr>
<td>Nominal Operating Voltage (Vdc)</td>
<td>6</td>
<td>12</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>Maximum Operating Voltage (Vdc)</td>
<td>7.3</td>
<td>14.5</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td>Maximum Pick-Up Voltage at +125°C</td>
<td>4.5</td>
<td>9</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Maximum Pick-Up Voltage at +125°C, continuous current test (Vdc)</td>
<td>5.7</td>
<td>11.25</td>
<td>22.5</td>
<td>22.5</td>
</tr>
<tr>
<td>Drop-Out Voltage at +125°C</td>
<td>0.3 – 2.5</td>
<td>0.75 – 4.5</td>
<td>1.5 – 7.0</td>
<td>1.5 – 7.0</td>
</tr>
<tr>
<td>Maximum Coil Current at +25°C (mA)</td>
<td>.50</td>
<td>.26</td>
<td>.15</td>
<td>.15</td>
</tr>
<tr>
<td>Back EMF Suppressed to (Vdc)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>-42</td>
</tr>
<tr>
<td>Coil Resistance</td>
<td>18Ω</td>
<td>70Ω</td>
<td>290Ω</td>
<td>290Ω</td>
</tr>
</tbody>
</table>
## Specifications

### Electrical Data

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Insulation Resistance (note 1)</td>
<td>100 megohms, minimum, at 500Vdc, between each pin and case</td>
</tr>
<tr>
<td>Insulation Resistance After Life or Environmental Test (note 1)</td>
<td>50 megohms, minimum, at 500Vdc, between each pin and case</td>
</tr>
<tr>
<td>Dielectric Strength At Sea Level</td>
<td></td>
</tr>
<tr>
<td>Contacts to Ground and Between Contacts</td>
<td>1,250Vrms, 60 Hz.</td>
</tr>
<tr>
<td>Coil to Ground</td>
<td>1,000Vrms, 60 Hz.</td>
</tr>
<tr>
<td>Dielectric Strength at 80,000 ft (25,000m), All Points (note 4)</td>
<td>500Vrms, 60 Hz.</td>
</tr>
<tr>
<td>Ambient Temperature Range, Operating</td>
<td>-70°C to +125°C</td>
</tr>
<tr>
<td>Altitude</td>
<td>300,000 feet</td>
</tr>
</tbody>
</table>

### Environmental Data

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shock Resistance</td>
<td>50 G's, 11 ms.</td>
</tr>
<tr>
<td>Vibration Resistance, Sinusoidal</td>
<td>20 G's, 75-3000Hz.</td>
</tr>
</tbody>
</table>

### Mechanical Data

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approximate Weight</td>
<td>3.2 oz. (90g) Max.</td>
</tr>
</tbody>
</table>

### NOTES

1. All wired terminals must be connected together during this test. Dielectric withstanding voltage and insulation resistance are measured between all mutually insulated wired terminals and between all these terminals and case.

## Terminals

### CODE “B”

**Solder Pin Terminals**

*Tin/Lead Plated*

- Code: K

- Tin/Lead Plated

- **Solder Hook Terminals**

*Tin/Lead Plated*

- Code: K

- Tin/Lead Plated

- **Terminal Shield**

-Kovar is a trademark of Carpenter Technology Corporation.
Outline Dimensions

The standard terminal types and enclosures are illustrated below with dimensions in inches ± 0.010 and (millimeters ± 0.25).

Enclosures

<table>
<thead>
<tr>
<th>CODE</th>
<th>Dimensions</th>
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<tbody>
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<tr>
<td></td>
<td>1.015</td>
</tr>
<tr>
<td></td>
<td>1.718 MAX</td>
</tr>
<tr>
<td></td>
<td>1.396</td>
</tr>
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</tr>
<tr>
<td></td>
<td>.937</td>
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<td></td>
<td>.040</td>
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</table>

<table>
<thead>
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<tbody>
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<td>1.396</td>
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</tr>
<tr>
<td></td>
<td>.937</td>
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<tr>
<td></td>
<td>.040</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>CODE</th>
<th>Dimensions</th>
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</thead>
<tbody>
<tr>
<td>&quot;X&quot;</td>
<td>1.015</td>
</tr>
<tr>
<td></td>
<td>1.396</td>
</tr>
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<td></td>
<td>1.446</td>
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<tr>
<td></td>
<td>1.718 MAX</td>
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<td></td>
<td>.810</td>
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<td></td>
<td>.040</td>
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</table>

<table>
<thead>
<tr>
<th>CODE</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;R&quot;</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>1.015</td>
</tr>
<tr>
<td></td>
<td>1.718 MAX</td>
</tr>
<tr>
<td></td>
<td>1.396</td>
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<td></td>
<td>.625</td>
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<td></td>
<td>.810</td>
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</table>

<table>
<thead>
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<th>CODE</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
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<td>&quot;Z&quot;</td>
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<td>1.396</td>
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<td>1.446</td>
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<td>.625</td>
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<td>.810</td>
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</table>
## Terminal Wiring

### DC Coils

<table>
<thead>
<tr>
<th>A1</th>
<th>A2</th>
<th>X1</th>
<th>X2</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>C</td>
<td>K</td>
<td>K</td>
</tr>
</tbody>
</table>

### DC Coils with Transient Suppression

<table>
<thead>
<tr>
<th>A1</th>
<th>A2</th>
<th>X1</th>
<th>X2</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>C</td>
<td>K</td>
<td>K</td>
</tr>
</tbody>
</table>

### NOTE:
- Polarity must be observed with DC coil supply. Relay is polarized with a permanent magnet and will not operate or be damaged by reverse polarity.
- Diodes used in transient suppression and in AC rectifier circuits have peak inverse voltage rating of 600 VDC minimum. Zener diodes have a minimum rating of 1 watt.
- Terminal designations are for reference only and do not appear on the header.

## How to Order

<table>
<thead>
<tr>
<th>Typical Part Number</th>
<th>FCAC-150</th>
<th>B</th>
<th>Y</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series and Contact Arrangement:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FCAC-150 = Relay with 1 Form X Main Contacts, 1 Form C Aux. Contacts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terminals (see drawings for details):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B = Solder Pin Coil Terminals, Stud Power Terminals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C = Solder Hook Coil Terminals, Stud Power Terminals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K = Terminal Block, Stud Power Terminals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enclosure (see drawings for details):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R = Horizontal Flange Mount, Rotated</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U = Flush Vertical Flange Mount</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y = Raised Vertical Flange Mount</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z = No Mount</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coil:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 = 6Vdc nominal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 = 12Vdc nominal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 = 28Vdc nominal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 = 28Vdc nominal, with back EMF suppression</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**NOTE:** 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.

**Contact Information:**
- **USA:** 1-800-522-6752
- **Canada:** 1-905-470-4425
- **Mexico:** 01-800-733-8926
- **C. America:** 55-11-2103-6000
- **South America:** 55-11-2103-6000
- **UK:** 44-8706-080-208
- **Hong Kong:** 852-2735-1628
- **Japan:** 81-44-844-8013
- **www.tycoelectronics.com**
Selection and Application Guide

This selection and application guide is suggested practices from ARP (Aerospace Recommended Practice) 4005 Concerning proper performance of relays.

Caution:
The use of any coil voltage less than the rated coil voltage may compromise the operation of the relay. Choosing the proper relay depends primarily on matching the relay to the load, power supply, and environment. Selection should be limited to items that meet the following requirements:

A. Contacts must be rated for the load. Current rating, type of load (resistive, lamp, motor, inductive, and so forth), impedance range, voltage rating, DC or AC, frequency, single phase or polyphase, polyphase load balance, and type of switching or transfer should all be considered. Each of the following switching and transfer functions places a different requirement on each of the relay contacts and must be considered when selecting a relay with the proper contact rating:
   (1) On-Off Switching - DC, single phase or polyphase
   (2) Motor Reversing (AC or DC)
   (3) Transferring load between phases of same source
   (4) Transferring load between unsynchronized AC sources

B. Power supply characteristics must be taken into account. Voltage regulation, variations in frequency, ripples and spikes, as well as steady state conditions, should be included. If more than one power supply is involved, not only must each be suitable but interaction between them also should be investigated.

C. Coil (or coils) should be rated so as to have proper operation under all anticipated conditions.

D. Consideration of environmental conditions anticipated throughout the service of life, as well as those expected during storage and transportation before installing the relays in equipment, is mandatory. Electrical parameters, environmental factors, mechanical stresses, and compatibility are among the categories for which the relay must be reviewed.

E. The circuit in which the relay is used, the interlocking feature employed, the wiring harness, and the associated components should all be reviewed for assuring mutual suitability.

F. Relays should be hard wired whenever possible, to avoid the need for additional contact points associated with the relay plug-in socket arrangement. (Plug-in types should be considered for quick turnaround times).

G. To permit “safe” isolation of relay circuit in the OFF condition, and better eliminate an electrical shock hazard, an electromechanical switching device should be placed between the positive terminal of the power source and relay coil.

H. Proper transistor control of the relay coil requires a stable reference voltage. This can be done by connecting the plus side of the coil to the positive side of the power source, the minus side of the relay coil to the collector of an NPN transistor, the emitter of the transistor to the grounded side of the power source, and the transistor base to the control voltage. For example, see MIL-R-28776/1.

I. Any switching device controlling the relay coil circuit must be capable of withstanding, without damage, the sum of the maximum coil circuitry voltage and the peak value of transient voltage that results when the coil circuit is opened; for example, a switch controlling a relay coil that is supplied with a 28V DC line and subjected to a transient voltage suppressed to 42V must be capable of withstanding 28V + 42V or a 70V surge without damage.

J. In selecting solid state electronic switching devices to control relay coil circuits, care must be used in selecting a solid state device with a leakage current (in the “off state”) that is sufficiently low to permit the relay to drop out.

K. Control of the relay coil circuit by other than step-function switching may invalidate published relay performance properties such as pickup and dropout voltages, pickup, dropout, and bounce times.
## Cross Reference - Socket to Relay

<table>
<thead>
<tr>
<th>Military Socket P/N</th>
<th>Relay Part Number</th>
<th>Relay Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12883/40-01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M12883/40-05</td>
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<tr>
<td>M12883/40-07</td>
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<tr>
<td>M12883/40-11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M12883/40-13</td>
<td>M83536/15-022</td>
<td>4 Pole, 10 Amp</td>
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<tr>
<td>M12883/40-17</td>
<td>M83536/16-006, 014, 031, 034</td>
<td></td>
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<tr>
<td>M12883/40-19</td>
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<tr>
<td>M12883/40-23</td>
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NOTE: Tyco Electronics Does Not Manufacture Relay Sockets.

This Socket to Relay cross reference is provided for additional design assistance. Several of Tyco Electronics Authorized Distributors carry relay sockets for your convenience. Relay sockets come with a variety of profiles, mounting styles, and mounting hardware options, so please contact the relay socket supplier of your choice or one of our Authorized Distributors who carry relay sockets for additional information.