Table of Contents

Catalog 5-1773450-5
Revised 3-13

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

Dimensions are in millimeters unless otherwise specified.

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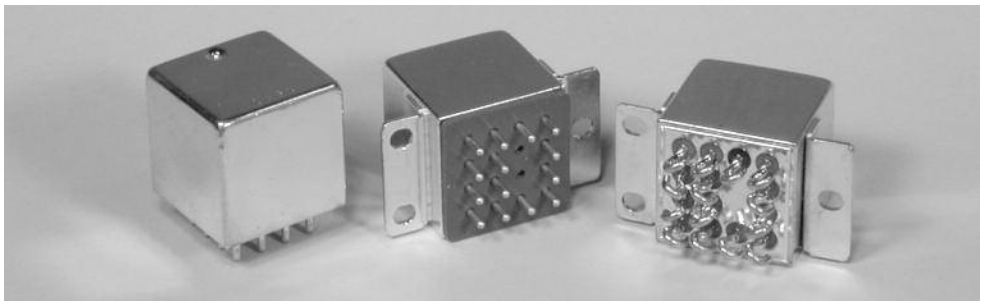
TD2 Series Time Delay Relay

Product Facts

- **Qualified to:**

  MIL-PRF-83726/28
  MIL-PRF-83726/29
  MIL-PRF-83726/30
  MIL-PRF-83726/31
- **Fixed delay on operate, fixed delay on release, adjustable delay on operate & adjustable delay on release**
- **Meets or exceeds electrostatic discharge MIL-STD-1686 Class Non-Sensitive**
- **Welded hermetically sealed enclosure occupies about 1 in³ (16.4 cm³)**
- **10A, 2 form C (DPDT) output contacts**



TD2 series time delay relays are available for delay on operate or delay on release operation. Either can be supplied as fixed or resistor adjustable types. Both military and commercial versions are offered.

These products consist of solid state timing circuits controlling our FCA-210 series relays, providing 2 Form C (DPDT) output contacts rated 10 amps. The internal timing circuit uses an R/C controlled oscillator with a programmable digital pulse counter, gating a semiconductor switch to operate the relay. Timing is independent of whether the controlling voltage is a ramp or step function.

For the adjustable models the user specifies a one decade range in seconds, within which the required delay will be set. This range is programmed internally at the time of manufacture. The required delay is obtained by calculating the oscillator timing resistor as follows and connecting it externally to terminals 1D - 3D as below.

R_{EXT} = [(T_1 / T_0) -1] 100K Ohms

T_0 = Minimum time of selected decade in seconds.

T1 = Required time delay.

EXAMPLE

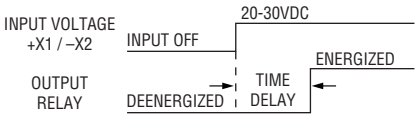
Selected Range = 3-30 sec

Required Time = 15 sec

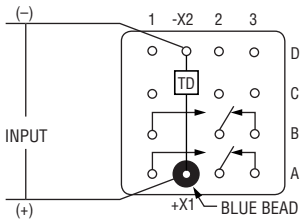
R_{EXT} = [(15/3) -1] 100K = 400K

Timing Action and Terminal Wiring

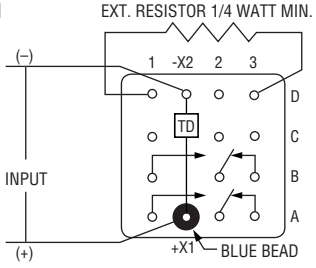
Delay On Operate:
The time delay starts on the application of input voltage to X1-X2. The timing circuit energizes the end of the time delay period.



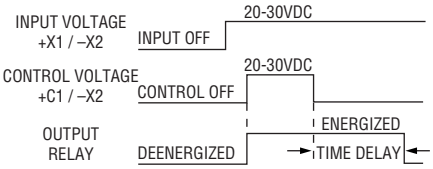
Fixed Model



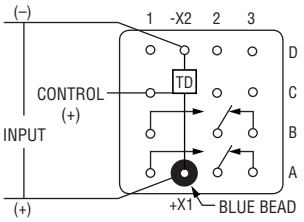
Adjustable Model



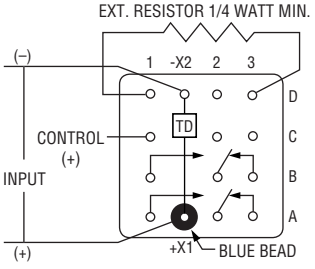
Delay On Release:
The input voltage is continuous to X1-X2. When the control voltage is applied to C1-X2 the timing circuit and the relay are both energized. The time delay starts when the control voltage is shut off.



Fixed Model



Adjustable Model



Terminal designations shown in the diagrams above are for reference only. They do not appear on the relay header.

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TD2 Series Time Delay Relay (Continued)

Specifications

Timing Data	
Timing Action	Delay on Operate or Delay on Release
Time Delay, Fixed – M83726/28, /29 and Commercial 28C, 29C	Select from 0.1 to 600 sec for Commercial Models Select from 0.1 to 500 sec for Mil-Spec Models
Time Delay, Adjustable – M83726/30, /31 and Commercial 30C, 31C	Select one decade between 0.1 to 1.0 and 60 to 600 seconds
Timing Accuracy (note 1)	±10% of Nominal Value
Recycle Time (note 2)	50 ms, max., to next cycle.
Power Interrupts	Accuracy is not affected by power interruptions up to 1 ms spaced at least 10ms apart.
Input Data	
Input Voltage	28 Vdc nominal, range 20 - 32 Vdc
Duty Rating	Continuous
Input Current	110 mAdc Max @ 25°C
Control Voltage (applies only to Delay on Release type)	20 - 32 Vdc
Control Current	15 mAdc Max (applies only to delay on release types)
Input Voltage Polarity Protection	The timer will be inoperative during, and undamaged by, reversal of the polarity of the input voltage.
Output Data	
Contact Form	2 Form C (DPDT)
Contact Material	Silver Cadmium Oxide, Gold plated
Contact Rating in Amps (Continuous Duty)	

Type of Load	Life (Min.) Cycles	28 Vdc	115 Vac 400Hz	115/200 Vac – 3 phase 400 Hz.	115/200 Vac – 3 phase 60 Hz.*
Resistive	100×10^3	10	10	10	2.5
Inductive	20×10^3	8	8	8	2.5
Motor	100×10^3	4	4	4	2.0
Lamp	100×10^3	2	2	2	1.0

* 60 Hz. loads are rated at 10×10^3 cycles.

Overload Current	40 Adc; 60A, 400 Hz.
Rupture Current	50 Adc; 80A, 400 Hz.
Max. Contact Drop at 10A	Initial 0.150V; After Life 0.175V
Electrical Data	
Electrostatic Discharge Withstand Voltage	16,000V
Transients (note 3):	
Positive Transients	+80V
Self-generated Transients	±50V, Max.
Spike Susceptibility	±600V, 10 µs, Max.
Insulation Resistance (note 4)	1,000 megohms at 500Vdc, between each pin and case
Dielectric Strength (note 4)	1,000Vrms at 60 Hz at sea level, between case and all pins connected together
Environmental Data	
Ambient Temperature Range, Operating	-55°C to +125°C
Altitude	80,000 feet maximum
Shock Resistance	100 G's, 6 ms.
Vibration Resistance, Sinusoidal	Z & Y Enclosure: 30 G's, 33-3000Hz.; X & W Enclosure: 20 G's, 33-3000Hz.
Mechanical Data	
Approximate Weight	2.5 oz. (71g) Max.

NOTES

1. The accuracy requirement applies to any combination of operating temperature and voltage. Add ±10ms for timing less than one second.
2. Recycle time to assure that the next timing cycle will be completed. Units can be recycled during timing and after time-out:
   Delay on operate models – Power must be OFF the input at least 10 ms. Delay on release models – Power must be ON the control terminal at least 10 ms.
3. Transient specifications are based on a maximum duty cycle of 1/50.
4. 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.
5. Inductive loads must be diode suppressed.

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TD2 Series Time Delay Relay (Continued)

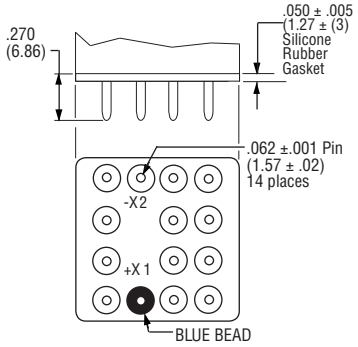
Outline Dimensions

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

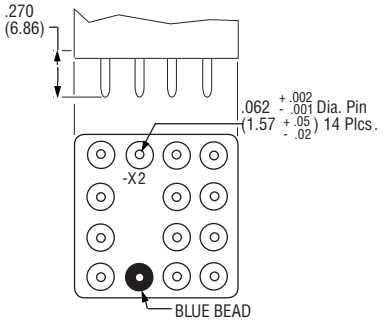
Terminals

All terminals on 0.200 (5.4) centers.

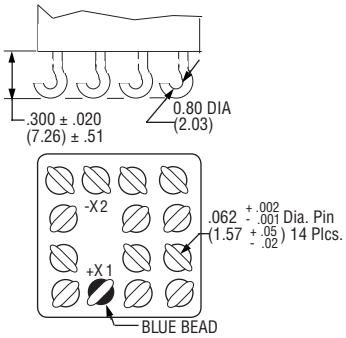
CODE "P"
Socket Pins – Gold Plated



CODE "T"
Circuit Board Pins – Tin/Lead Plated



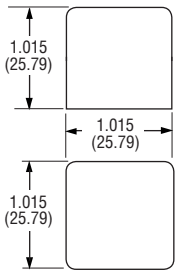
CODE "S"
Solder Hooks



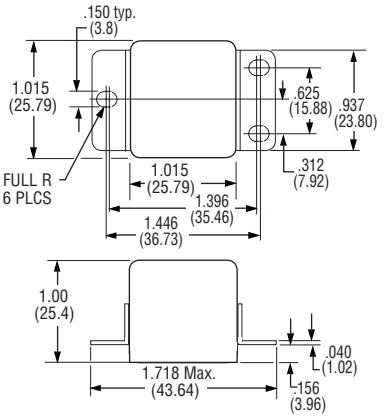
Enclosures

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

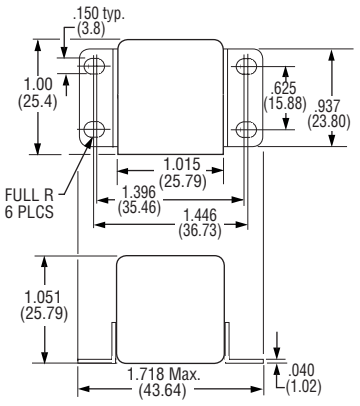
CODE "Z"



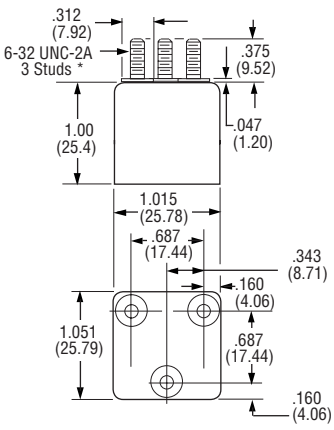
CODE "Y"



CODE "X"



CODE "W"



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

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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TD2 Series Time Delay Relay (Continued)

Part Numbering System
Mil-Spec Types

Typical Mil-Spec Part Number	TD2	28-	5002	P

Series:

TD2 = Time delay relay with 2 pole, 10A output

Mil-Spec Model:

28 = M83726/28 (Fixed, Delay on Operate)
29 = M83726/29 (Fixed, Delay on Release)
30 = M83726/30 (Adjustable, Delay on Operate)
31 = M83726/31 (Adjustable, Delay on Release)

Time Delay Range (Within 0.1 to 500 seconds):

For /28 and /29 types (fixed types), the delay is expressed in milliseconds in a four-digit code. The first three digits are significant. The fourth is the number of zeros following the first three.
Example: 5002 is 50 seconds.

For /30 and /31 types (adjustable types), the delay decade range is expressed in milliseconds in a four-digit code representing the upper limit of the range. The first three digits are significant. The fourth is the number of zeros following the first three.
Example: 1001 is 1 second, so the range is 0.1 to 1 second.

Terminals:

P= Socket Pin Terminals
S= Solder Hook Terminals

Note: Mil-spec models have “Y” type enclosure.

Commercial Types

Typical Commercial Part Number	TD2	28C-	1001	P	Y

Series:

TD2 = Time delay relay with 2 pole, 10A output

Commercial Model:

28C = Fixed, Delay on Operate (COTS version of M83726/28)
29C = Fixed, Delay on Release (COTS version of M83726/29)
30C = Adjustable, Delay on Operate (COTS version of M83726/30)
31C = Adjustable, Delay on Release (COTS version of M83726/31)

Time Delay Range (Within 0.1 to 600 seconds):

For fixed types, the delay is expressed in milliseconds in a four-digit code. The first three digits are significant. The fourth is the number of zeros following the first three.
Example: 5002 is 50 seconds.

For adjustable types, the delay decade range is expressed in milliseconds in a four-digit code representing the upper limit of the range. The first three digits are significant. The fourth is the number of zeros following the first three.
Example: 1001 is 1 second, so the range is 0.1 to 1 second.

Terminals:

P= Socket Pin Terminals
S= Solder Hook Terminals
T= Solder Pin Terminals

Enclosure

W = Mounting Studs
X = Horizontal Flange Mount
Y = Raised Vertical Flange Mount
Z = No Mount

NOTE: Commercial versions are available with timing ranges outside of .1 to 600 sec. range.

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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FCB-205 Series, 5 Amperes, DPDT

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**

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

Contact Rating — Amperes Ratings Are Continuous Duty

Type of Load	Life (Min.) Cycles x 10^3	28 VDC	115VAC 400Hz	115/200VAC 400Hz, 3Ø
Resistive	100	5	5	5
Inductive	20	3	5	5
Motor	100	2	3	3
Lamp	100	1	1	1

*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* —
Z, 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* —
Z, 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 3000 Hz

Vibration, Random* —
Z, Y, & X Enclosures —
0.4 g^2/Hz 50-2000Hz
T, W & M Enclosures —
0.2 g^2/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

Coil Data

Coil Code	Nominal Voltages	Freq. Hz	DC Res. (B)	Over Temperature Range		
				Pickup or Below Volts	Dropout or Above Volts	Must Hold Voltage (C)
1	6	DC	20 Ω	4.5	0.3	2.5
2	12	DC	95 Ω	9.0	0.75	4.5
3	28	DC	500 Ω	18.0	1.5	7.0
4 (A)	28	DC	500 Ω	18.0	1.5	7.0
5	48	DC	1600 Ω	36.0	2.5	14.0

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.

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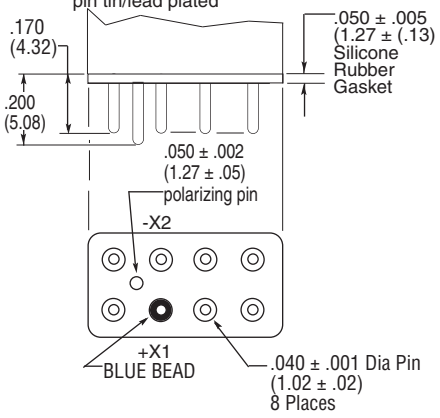
FCB-205 Series, 5 Amperes, DPDT (Continued)

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

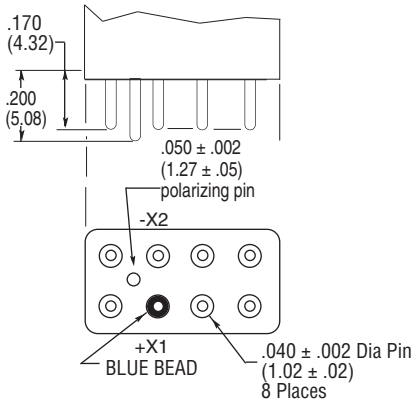
CODE "A" — **Socket Pin Terminals**

Socket Pins Gold Plated. Polarizing pin tin/lead plated



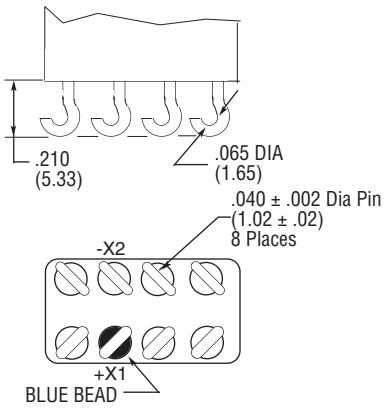
CODE "B" — **Solder Pin Terminals**

All Terminals Tin/Lead Plated



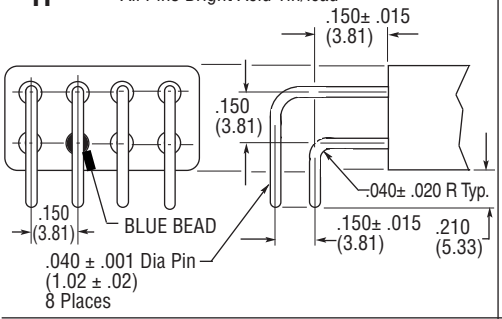
CODE "C" — **Solder Hook Terminals**

Hook Terminals Tin/Lead Plated

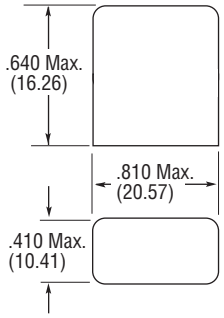


CODE "H" — **90° Solder Pins**

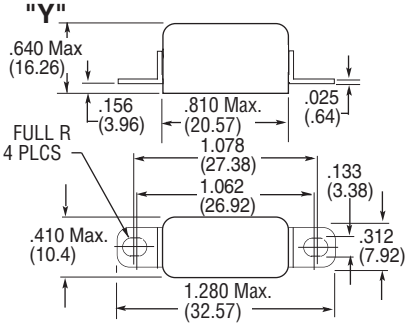
All Pins Bright Acid Tin/lead



CODE "Z"



CODE "Y"



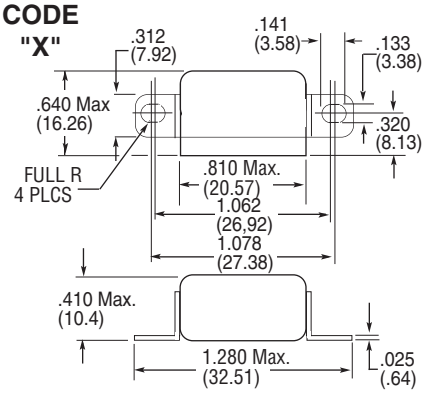
Enclosures

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

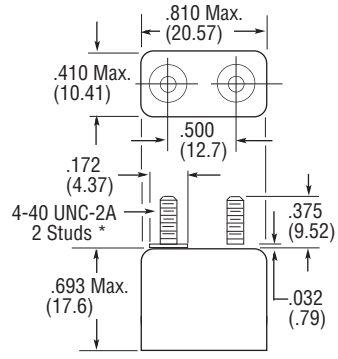
Dimensions: Inches ± .010 (mm ± .25)

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"



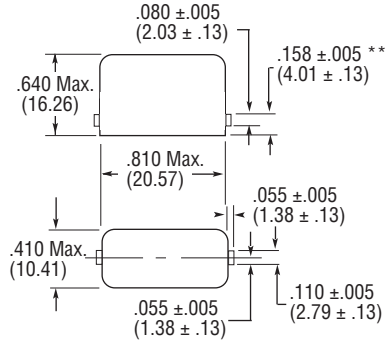
CODE "W"



*Metric threads available,To specify use M in place of W

CODE "T"

M83536/2-028
(REFERENCE ONLY)



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

** MEASURED FROM SURFACE OF HEADER

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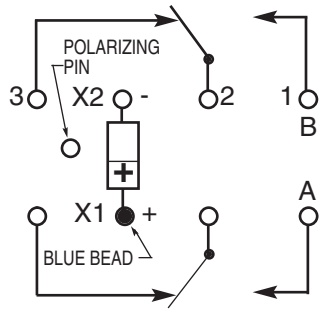
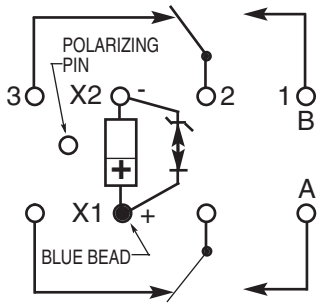
FCB-205 Series, 5 Amperes, DPDT (Continued)

Terminal Wiring

DC Coils



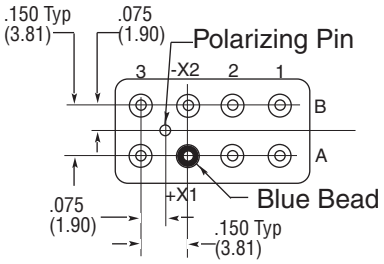
Transient Suppression



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.



TERMINAL VIEW

HOW TO ORDER

FCB-205-A Y 4

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.

Catalog 5-1773450-5
Revised 3-13

www.te.com

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

Dimensions are in millimeters unless otherwise specified.

USA: +1 800 522 6752
Asia Pacific: +86 0 400 820 6015
UK: +44 800 267 666

For additional support numbers please visit www.te.com

FCB-405 Series, 5 Amperes, 4PDT

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**

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

Contact Rating — Amperes Ratings Are Continuous Duty

Type of Load	Life (Min.) Cycles x 10^3	28 VDC	115VAC 400Hz	115/200VAC 400Hz-3Ø
Resistive	100	5	5	5
Inductive	20	3	5	5
Motor	100	2	3	3
Lamp	100	1	1	1

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 —
200 g for 6 mS
W, X & M Enclosures —
100 g for 6 mS
T Enclosure (In Track) —
50 g for 11 mS

Vibration, Sinusoidal* —
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, Random* —
Z & Y Enclosures —
0.4 g^2/Hz 50-2000Hz
T, W, X & M Enclosures —
0.2 g^2/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 — 6 ms or less

Release Time at Nominal Voltage — 6 ms or less

* Max. contact opening under vibration or shock 10 microseconds

Coil Data

Coil Code	Nominal Voltages	Freq. Hz	DC Res. (B)	Over Temperature Range		
				Pickup or Below Volts	Dropout or Above Volts	Must Hold Voltage (C)
1	6	DC	25 Ω	4.5	0.3	2.5
2	12	DC	78 Ω	9.0	0.75	4.5
3	28	DC	400 Ω	18.0	1.5	7.0
4 (A)	28	DC	400 Ω	18.0	1.5	7.0
5	48	DC	1275 Ω	36.0	2.5	14.0

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.

Catalog 5-1773450-5
Revised 3-13

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For additional support numbers please visit www.te.com

FCB-405 Series, 5 Amperes, 4PDT (Continued)

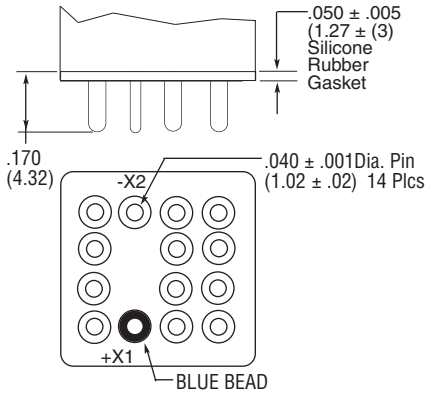
Below are shown the standard terminal types and the enclosures available. Specify the assembly as indicated under How To Order. Dimensions are shown in inches ± .010 and (Millimeters ± .25).

Terminals

CODE "A"

Socket Pins - All DC Coils

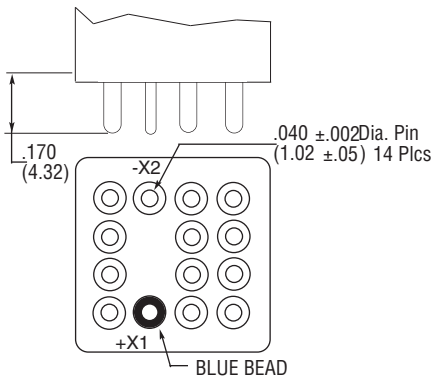
PIN TERMINALS ARE GOLD PLATED



CODE "B"

Solder Pin Terminals

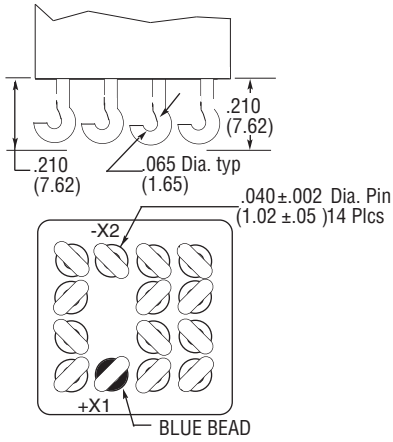
PIN TERMINALS TIN/LEAD PLATED



CODE "C"

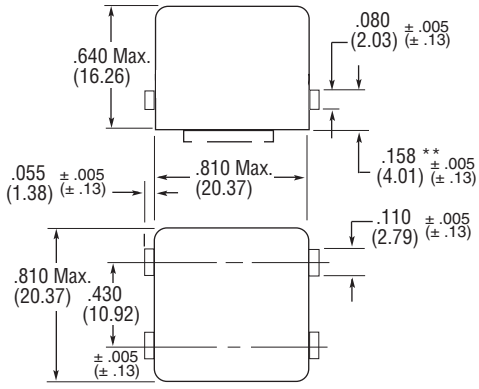
Solder Hook Terminals

HOOK TERMINALS TIN/LEAD PLATED



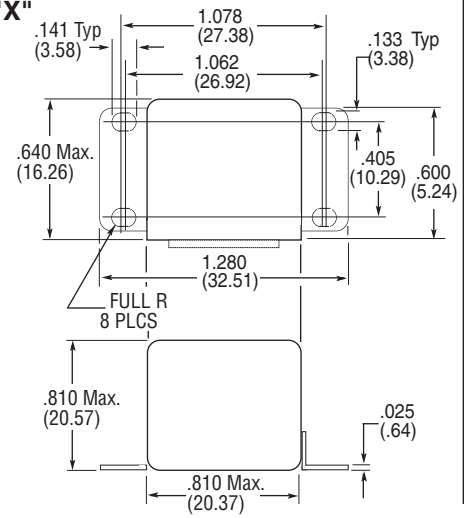
CODE "T"

M83536/6-025
(REFERENCE ONLY)



** Measured from surface of header

CODE "X"



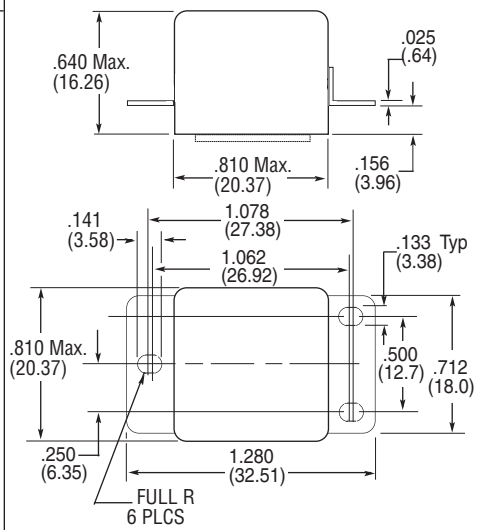
Enclosures

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

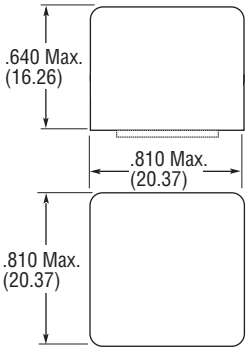
Dimensions: Inches ± .010 (mm ± .25)

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

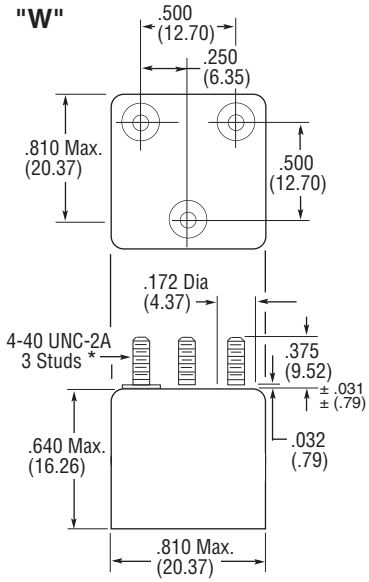
CODE "Y"



CODE "Z"



CODE "W"



Catalog 5-1773450-5
Revised 3-13

www.te.com

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

Dimensions are in millimeters unless otherwise specified.

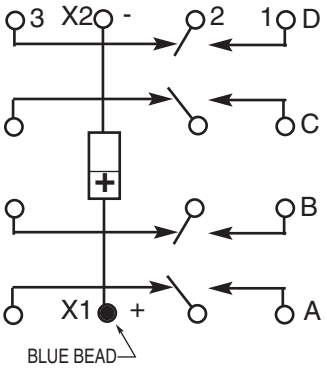
USA: +1 800 522 6752
Asia Pacific: +86 0 400 820 6015
UK: +44 800 267 666

For additional support numbers please visit www.te.com

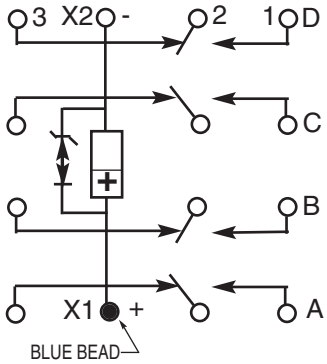
FCB-405 Series, 5 Amperes, 4PDT (Continued)

Terminal Wiring

DC Coils



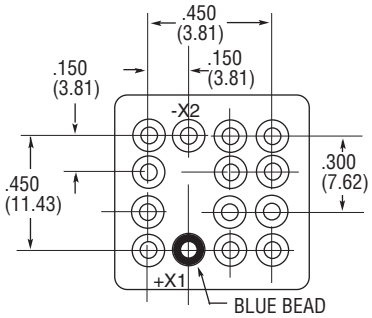
DC Coils with Transient Suppression



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.



TERMINAL VIEW

HOW TO ORDER

FCB-405-A Y 4

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.

Catalog 5-1773450-5
Revised 3-13

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

Dimensions are in millimeters unless otherwise specified.

USA: +1 800 522 6752
Asia Pacific: +86 0 400 820 6015
UK: +44 800 267 666

For additional support numbers please visit www.te.com

FCA-210 Series, 10 Amperes, DPDT

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**

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)

Contact Rating — Amperes
Ratings Are Continuous Duty

Type of Load	Life (Min.) Cycles x 10^3	28 VDC	115VAC 400Hz	115/200VAC 3Ø	
				400Hz	60Hz*
Resistive	100	10	10	10	2.5
Inductive	20	8	8	8	2.5
Motor	100	4	4	4	2.0
Lamp	100	2	2	2	1

*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, & X Enclosures —
200 g for 6 mS
W & M Enclosures (Stud Mtg.) —
100 g for 6 mS

Vibration, Sinusoidal* —
Z, Y, & X Enclosures —
30 g 33-3000Hz
W & M Enclosures (Stud Mtg.) —
20 g 33-3000Hz

Vibration, Random* —
Z, Y, & X Enclosures —
0.4 g^2/Hz 50-2000Hz
W & M Enclosures (Stud Mtg.) —
0.2 g^2/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 — 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

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

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.

NOTE: Only DC Coil Models are QPL Approved.

Catalog 5-1773450-5
Revised 3-13

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

Dimensions are in millimeters unless otherwise specified.

USA: +1 800 522 6752
Asia Pacific: +86 0 400 820 6015
UK: +44 800 267 666

For additional support numbers please visit www.te.com

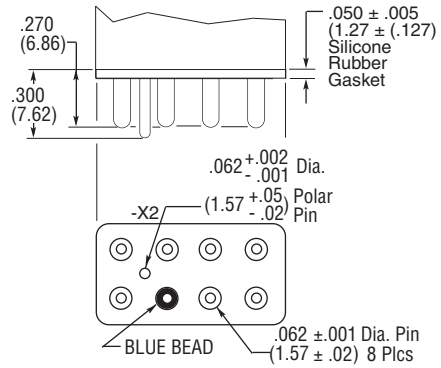
FCA-210 Series, 10 Amperes, DPDT (Continued)

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).

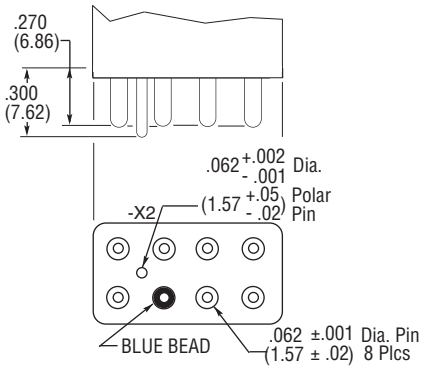
Terminals

SOCKET PINS ARE GOLD PLATED
POLARIZING PINS ARE TIN/LEAD PLATED
CIRCUIT BOARD PINS ARE TIN/LEAD PLATED
DIMENSIONS EXCEPT AS NOTED:
INCHES ± .010 (MILLIMETERS ± .25)

CODE "A" **Socket Pins - All DC Coils**

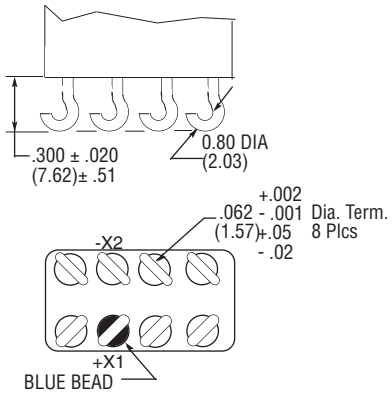


CODE "B" **Circuit Board Pins - All DC Coils**

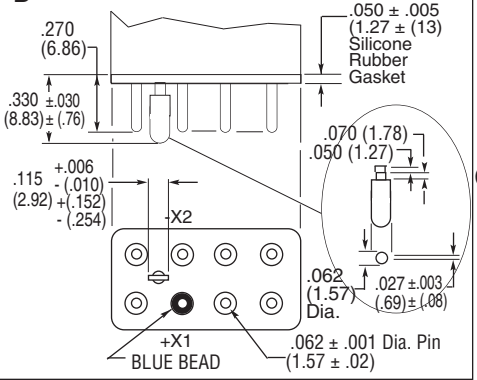


CODE "C" **Solder Hook Terminals**

HOOK TERMINALS TIN/LEAD PLATED

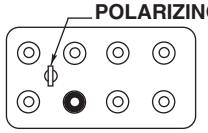


CODE "D" **Socket Pins 115 VAC**

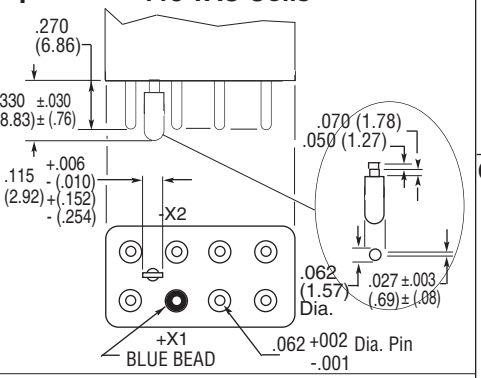


CODE "E" **Socket Pins 28 VAC Coils**

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

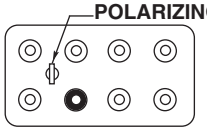


CODE "F" **Circuit Board Pins 115 VAC Coils**



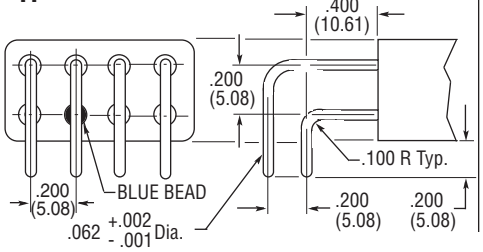
CODE "G" **Circuit Board Pins 28 VAC Coils**

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



CODE "H" **90˚ Solder Pins**

All Pins Bright Acid Tin/lead



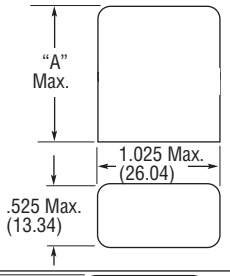
Enclosures

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

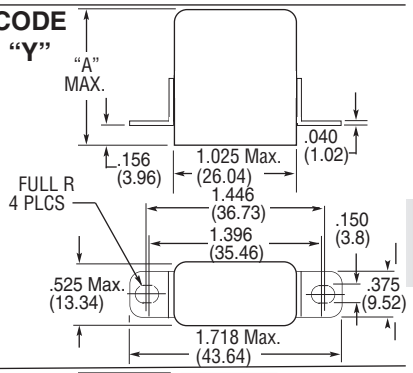
Dimensions: Inches ± .010 (mm ± .25)

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

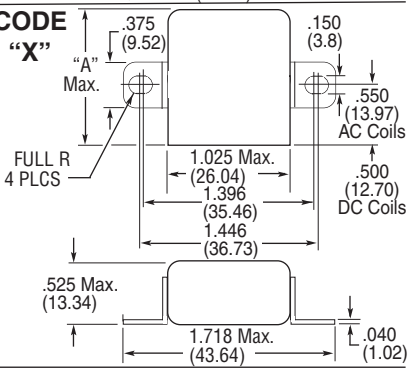
CODE "Z"



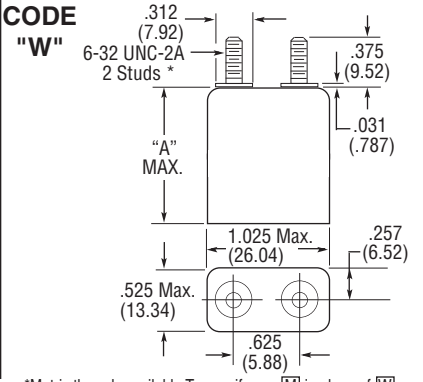
CODE "Y"



CODE "X"



CODE "W"



*Metric threads available, To specify use M in place of W

Catalog 5-1773450-5
Revised 3-13

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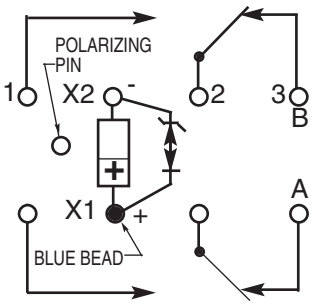
UK: +44 800 267 666

For additional support numbers please visit www.te.com

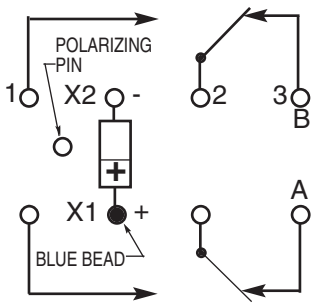
FCA-210 Series, 10 Amperes, DPDT (Continued)

Terminal Wiring

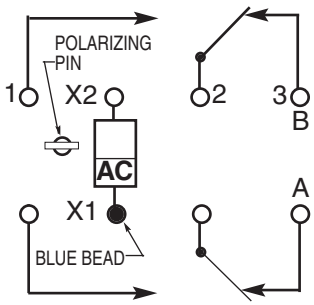
DC Coils with Transient Suppression



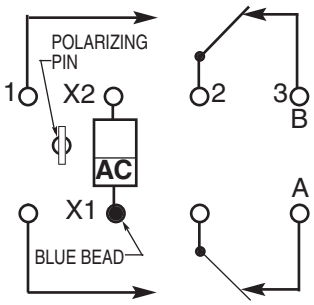
DC Coils



AC Coils 115 VAC



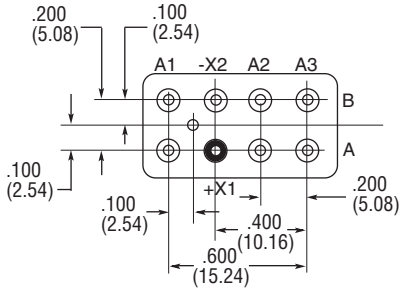
AC Coils 28 VAC



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.



TERMINAL VIEW

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

* 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.

Catalog 5-1773450-5
Revised 3-13

www.te.com

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

Dimensions are in millimeters unless otherwise specified.

USA: +1 800 522 6752
Asia Pacific: +86 0 400 820 6015
UK: +44 800 267 666

For additional support numbers please visit www.te.com

FCA-212 Series, 12 Amperes, DPDT

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)**

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

Contact Rating — Amperes
Ratings Are Continuous Duty

Type of Load	Life (Min.) Cycles x 10^3	28 VDC	115VAC 400Hz	115/200VAC 3Ø	
				400Hz	60Hz*
Resistive	100	12	12	12	2.5
Inductive	20	8	8	8	2.5
Motor	100	4	4	4	2.0
Lamp	100	2	2	2	1

*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 —
200 g for 6 mS
W & M Enclosures (Stud Mtg.) —
100 g for 6 mS

Vibration, Sinusoidal* —
Z, Y, & X Enclosures —
30 g 33-3000Hz
W Enclosure —
20 g 33-3000Hz

Vibration, Random* —
Z, Y, & X Enclosures —
0.4 g^2/Hz 50-2000Hz
W & M Enclosures (Stud Mtg.) —
0.2 g^2/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 — 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

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

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.

Catalog 5-1773450-5
Revised 3-13

www.te.com

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

Dimensions are in millimeters unless otherwise specified.

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Asia Pacific: +86 0 400 820 6015
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For additional support numbers please visit www.te.com

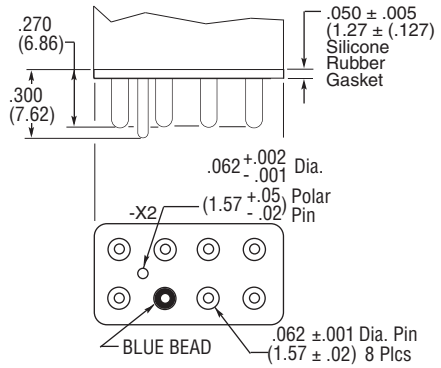
FCA-212 Series, 12 Amperes, DPDT (Continued)

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).

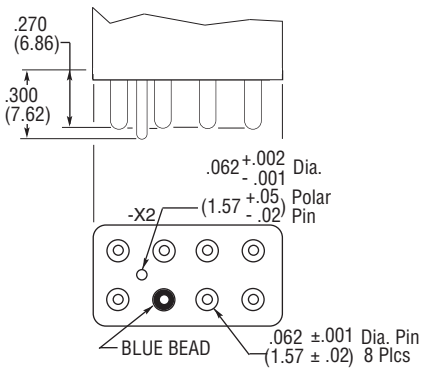
Terminals

SOCKET PINS ARE GOLD PLATED
POLARIZING PINS ARE TIN/LEAD PLATED
CIRCUIT BOARD PINS ARE TIN/LEAD PLATED
DIMENSIONS EXCEPT AS NOTED:
INCHES ± .010 (MILLIMETERS ± .25)

CODE "A" **Socket Pins - All DC Coils**

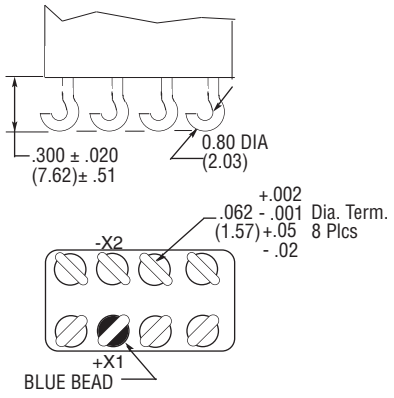


CODE "B" **Circuit Board Pins - All DC Coils**

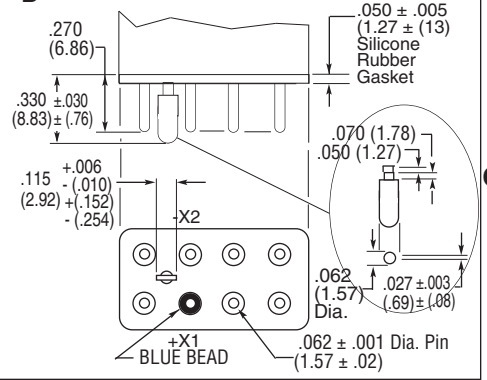


CODE "C" **Solder Hook Terminals**

HOOK TERMINALS TIN/LEAD PLATED

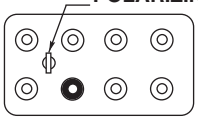


CODE "D" **Socket Pins 115 VAC**

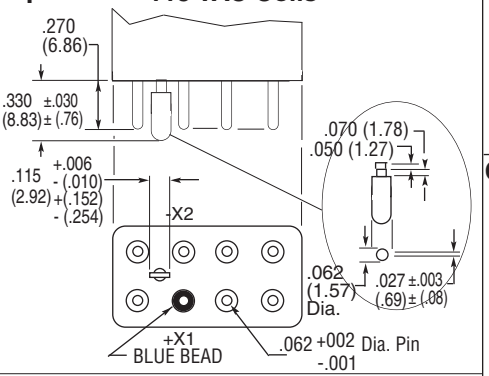


CODE "E" **Socket Pins 28 VAC Coils**

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

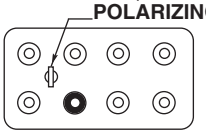


CODE "F" **Circuit Board Pins 115 VAC Coils**



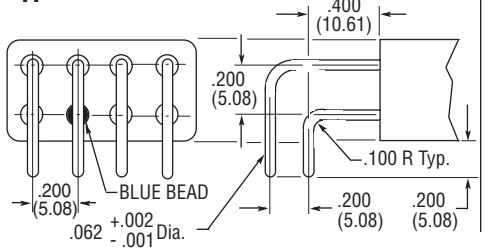
CODE "G" **Circuit Board Pins 28 VAC Coils**

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



CODE "H" **90˚ Solder Pins**

All Pins Bright Acid Tin/lead



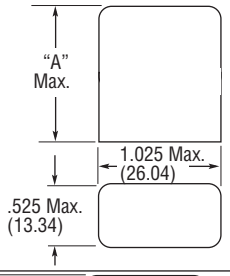
Enclosures

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

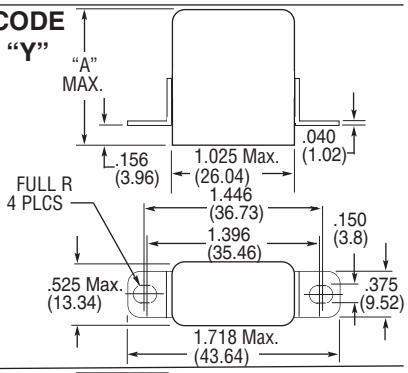
Dimensions: Inches ± .010 (mm ± .25)

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

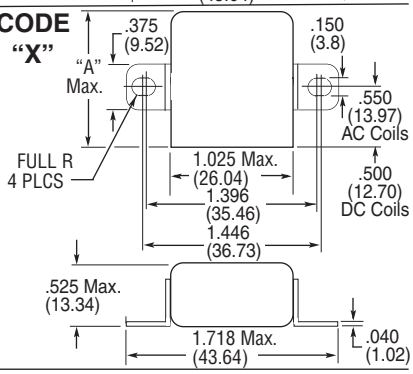
CODE "Z"



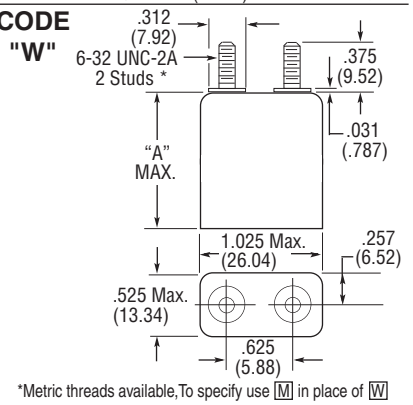
CODE "Y"



CODE "X"



CODE "W"



*Metric threads available,To specify use M in place of W

Catalog 5-1773450-5
Revised 3-13

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Dimensions are in millimeters unless otherwise specified.

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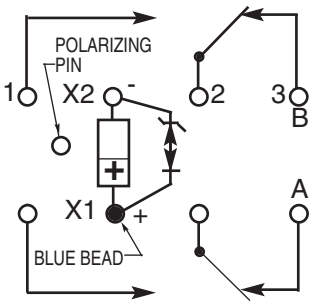
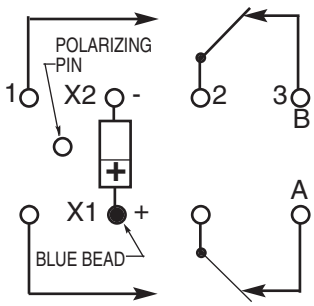
FCA-212 Series, 12 Amperes, DPDT (Continued)

Terminal Wiring

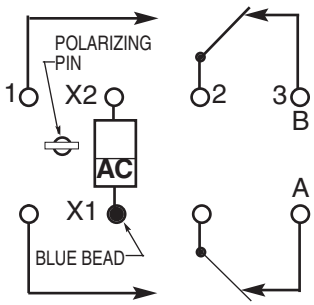
DC Coils with Transient Suppression



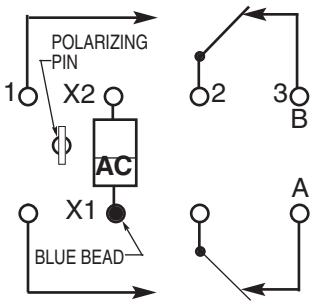
DC Coils



AC Coils 115 VAC



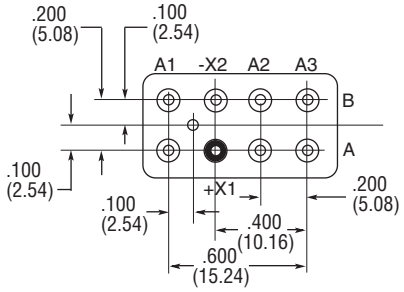
AC Coils 28 VAC



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.



TERMINAL VIEW

5

CII Mid-Range Relays

HOW TO ORDER

FCA-212-A Y 4

RELAY TYPE

TERMINALS (Socket Pins, DC Coil)

ENCLOSURE (With Flanges)

COIL (28 VDC With Transient Suppression).

Catalog 5-1773450-5
Revised 3-13

www.te.com

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

Dimensions are in millimeters unless otherwise specified.

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For additional support numbers please visit www.te.com

FCA-410 Series, 10 Amperes, 4PDT

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**

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. (Commercial Only)

Contact Rating — Amperes Ratings Are Continuous Duty

Type of Load	Life (Min.) Cycles x 10^3	28 VDC	120VAC 400Hz	120/200VAC	
				400Hz-3Ø	60Hz-3Ø*
Resistive	100	10	10	10	2.5
Inductive	20	8	8	8	2.5
Motor	100	4	4	4	2.0
Lamp	100	2	2	2	1.0

*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 3000Hz
W, X & M Enclosures —
0.12 DA 10 to 57Hz
20 g 57 to 3000Hz

Vibration, Random* —
Z & Y Enclosures —
0.4 g^2/Hz 50-2000Hz
W, X & M Enclosures —
0.2 g^2/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

Coil Code	Nominal Voltages	Freq. Hz	DC Res. AC Amps (B)	Over Temperature Range		
				Pickup or Below Volts	Dropout or Above Volts	Must Hold Voltage (C)
1	6	DC	18 Ω	4.5	0.3	2.5
2	12	DC	70 Ω	9.0	0.75	4.5
3	28	DC	290 Ω	18.0	1.5	7.0
4 (A)	28	DC	290 Ω	18.0	1.5	7.0
5	48	DC	865 Ω	32.0	2.5	14.0
6	28	400Hz	225 mA	22.0	1.25	10.0
7	28	50/400Hz	120 mA	22.0	1.25	10.0
8	115	400 Hz	40 mA	90.0	5.0	40.0
9	115	50/400 Hz	30 mA	95.0	5.0	40.0

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.

Catalog 5-1773450-5
Revised 3-13

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

Dimensions are in millimeters unless otherwise specified.

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For additional support numbers please visit www.te.com

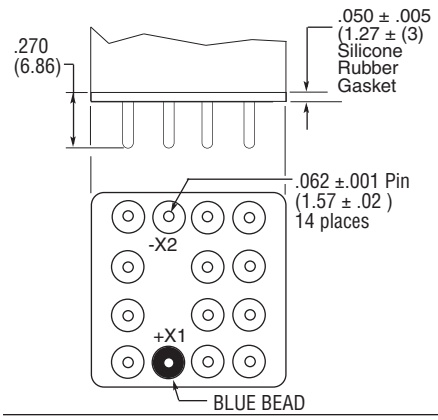
FCA-410 Series, 10 Amperes, 4PDT (Continued)

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.

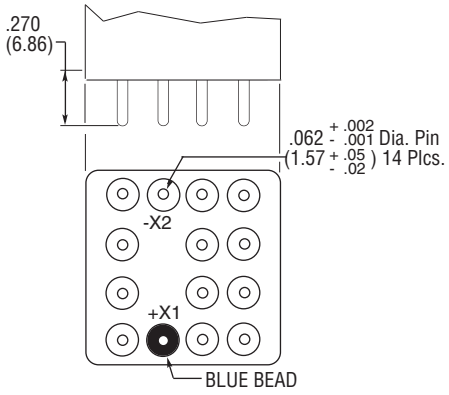
Terminals

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

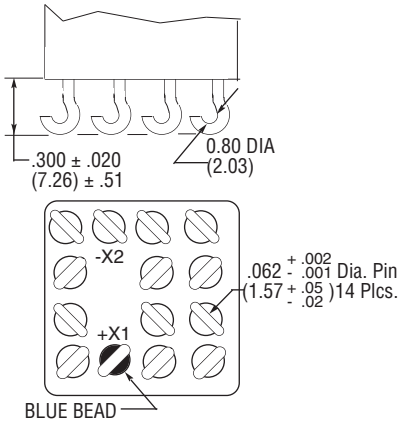
CODE "A"
Socket Pins-All DC Coils



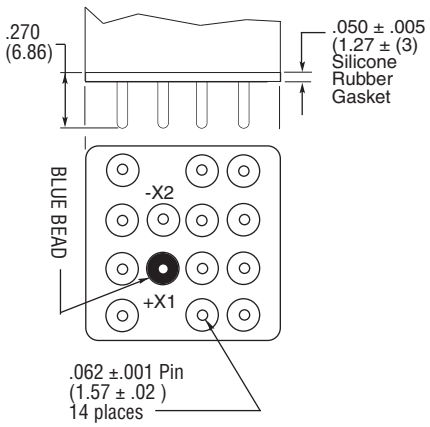
CODE "B"
Circuit Board Pins-All DC Coils



CODE "C"
Solder Hooks-AC or DC Coils



CODE "D"
Socket Pins-115 VAC Coils

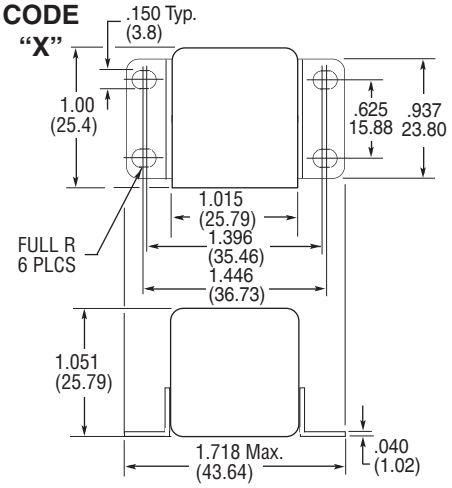


SEE NEXT PAGE

FOR MORE COIL

TERMINAL OPTIONS

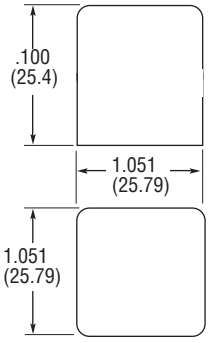
CODE "X"



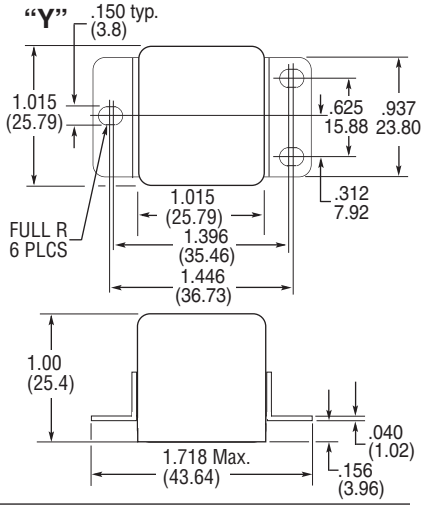
Enclosures

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

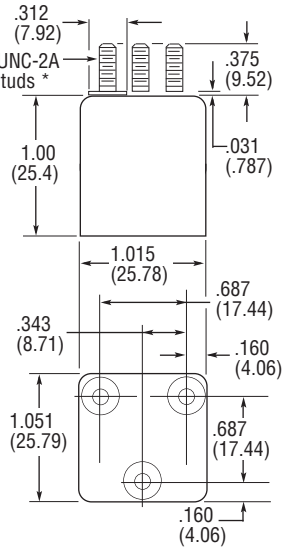
CODE "Z"



CODE "Y"



CODE "W"



*Metric threads available,To specify use M in place of W

Catalog 5-1773450-5
Revised 3-13

www.te.com

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Dimensions are in millimeters unless otherwise specified.

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Asia Pacific: +86 0 400 820 6015
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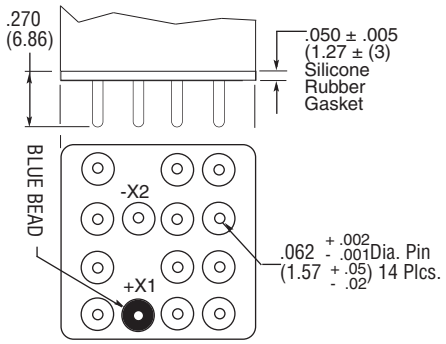
For additional support numbers please visit www.te.com

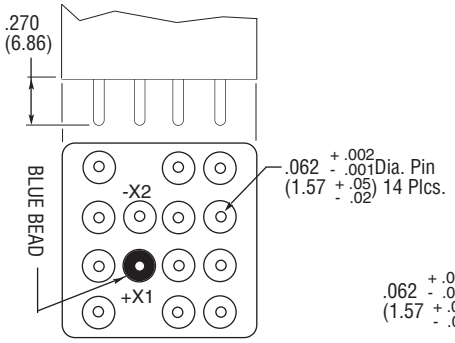
FCA-410 Series, 10 Amperes, 4PDT (Continued)

Terminals (Continued)

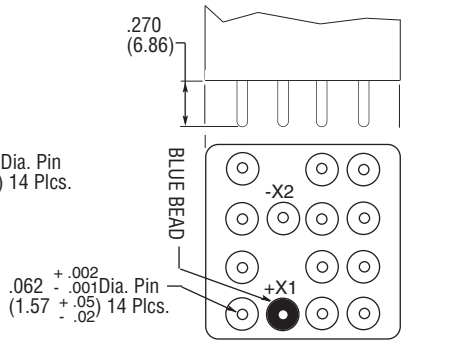
CODE "E"
Socket Pins- 28 VAC Coils



CODE "F"
Circuit Board Pins-115 VAC Coils

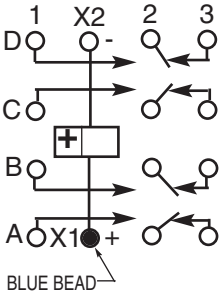


CODE "G"
Circuit Board Pins- 28 VAC Coils

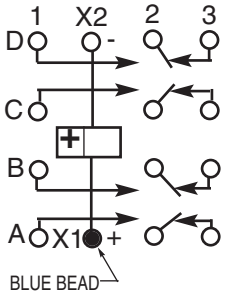


Terminal Wiring

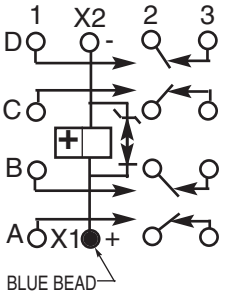
A & B Pin Terminal
All DC Coils



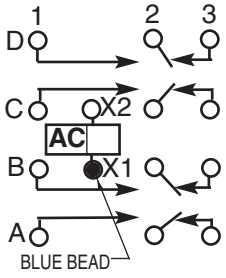
C Hook Terminal
All AC & DC Coils



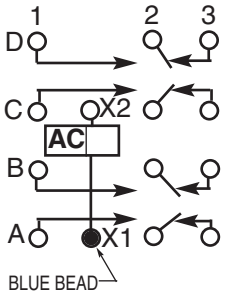
Transient Suppression
Cir.



D & F Pin Terminal
115 VAC Coils



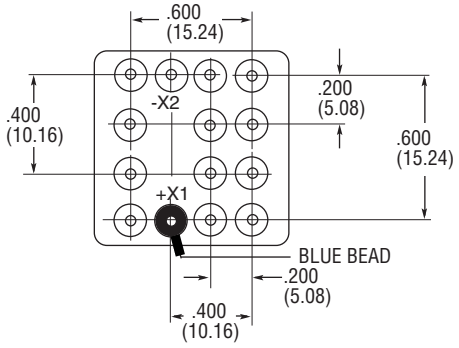
E & G Pin Terminal
28 VAC Coils



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.



TERMINAL VIEW

HOW TO ORDER

FCA-415-
FCA-410 A Y 4

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.

Catalog 5-1773450-5
Revised 3-13

www.te.com

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

Dimensions are in millimeters unless otherwise specified.

USA: +1 800 522 6752
Asia Pacific: +86 0 400 820 6015
UK: +44 800 267 666

For additional support numbers please visit www.te.com

FCA-125 Series, 25 Amperes, SPDT

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, M83536/36, /37**

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

Contact Rating — Amperes Ratings Are Continuous Duty

Type of Load	Life (Min.) Cycles x 10^3	28 VDC	115VAC 400Hz	115VAC 60Hz*
Resistive	50	25	25	10
Inductive	10	12	—	10
Inductive	20	—	15	—
Motor	50	10	10	8
Lamp	50	5	5	—

*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 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 —
200 g for 6 mS
W & M Enclosures (Stud Mtg.) —
100 g for 6 mS

Vibration, Sinusoidal* —
Z, Y, & X Enclosures —
30 g 33-3000Hz
W & M Enclosures (Stud Mtg.) —
20 g 33-3000Hz

Vibration, Random* —
Z, Y, & X Enclosures —
0.4 g^2/Hz 50-2000Hz
W & M Enclosures (Stud Mtg.) —
0.2 g^2/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 — 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

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

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.

NOTE: Only DC Coil Models are QPL Approved.

Catalog 5-1773450-5
Revised 3-13

www.te.com

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

Dimensions are in millimeters unless otherwise specified.

USA: +1 800 522 6752
Asia Pacific: +86 0 400 820 6015
UK: +44 800 267 666

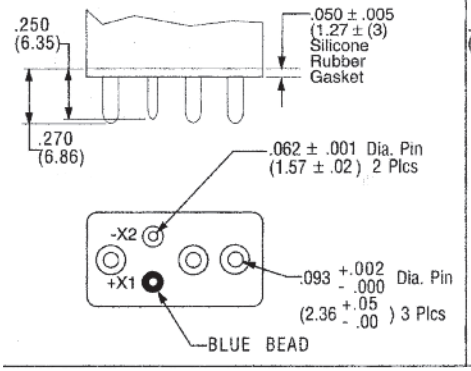
For additional support numbers please visit www.te.com

FCA-125 Series, 25 Amperes, SPDT (Continued)

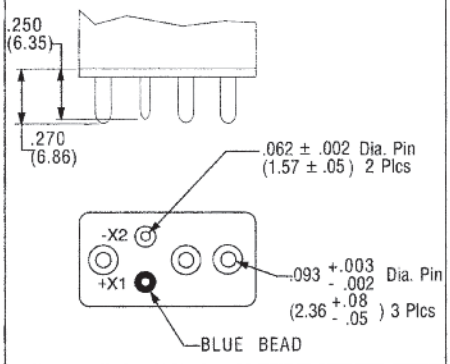
Below are shown the standard terminal types and the enclosures available. Specify the assembly as indicated under How To Order. Dimensions are shown in inches ± .010 and (Millimeters ± .25).

Terminals

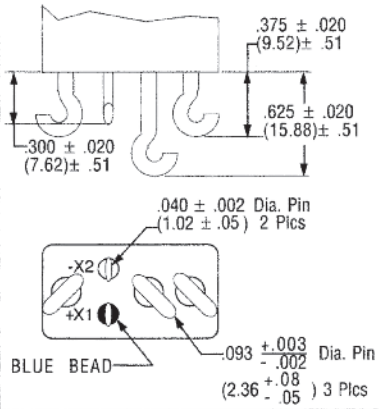
CODE "A"
Socket Pins - All DC Coils
PIN TERMINALS ARE GOLD PLATED



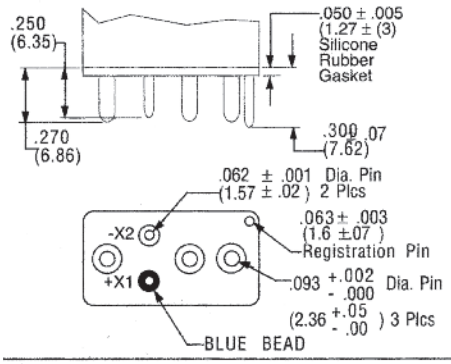
CODE "B"
Solder Pin Terminals
PIN TERMINALS TIN/LEAD PLATED



CODE "C"
Solder Hook Terminals
HOOK TERMINALS TIN/LEAD PLATED



CODE "D"
Socket Pins - All AC Coils
PIN TERMINALS ARE GOLD PLATED



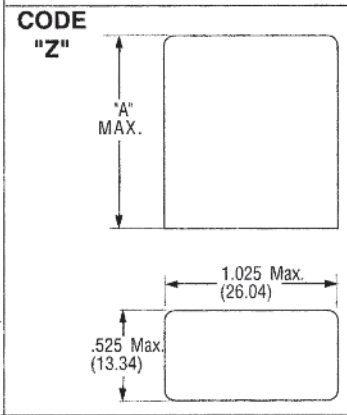
Enclosures

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

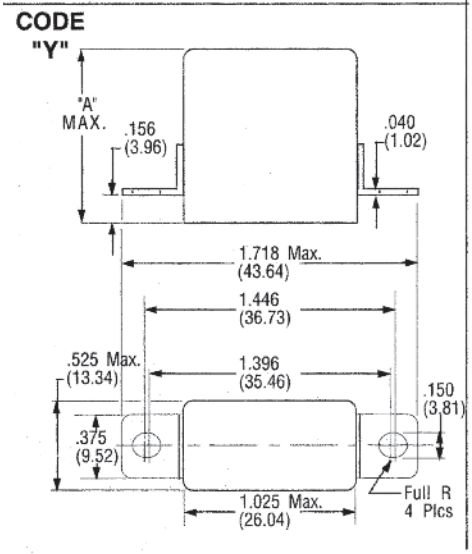
Dimensions: Inches ± .010 (mm ± .25)

"A" - AC Coils 1.125 in. (31.91) Max
DC Coils 1.010 in. (28.65) Max..

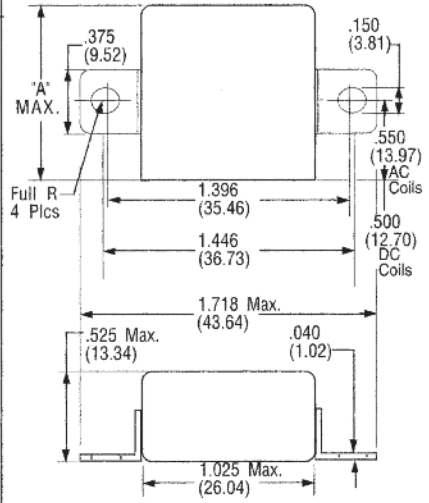
CODE "Z"



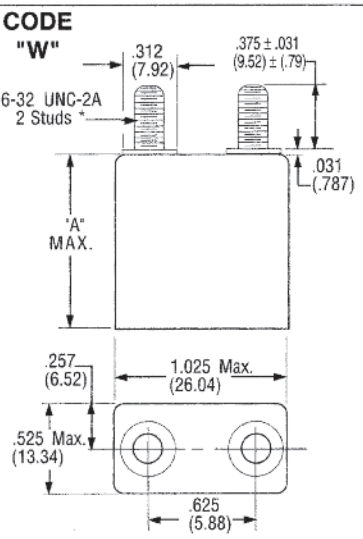
CODE "Y"



CODE "X"



CODE "W"



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

Catalog 5-1773450-5
Revised 3-13

www.te.com

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Dimensions are in millimeters unless otherwise specified.

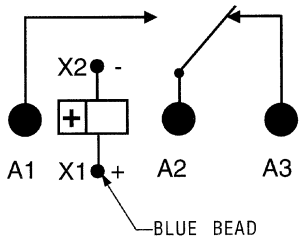
USA: +1 800 522 6752
Asia Pacific: +86 0 400 820 6015
UK: +44 800 267 666

For additional support numbers please visit www.te.com

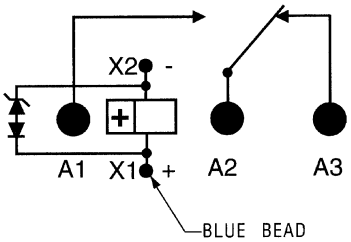
FCA-125 Series, 25 Amperes, SPDT (Continued)

Terminal Wiring

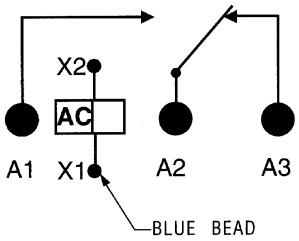
DC COILS



DC COILS WITH TRANSIENT SUPPRESSION



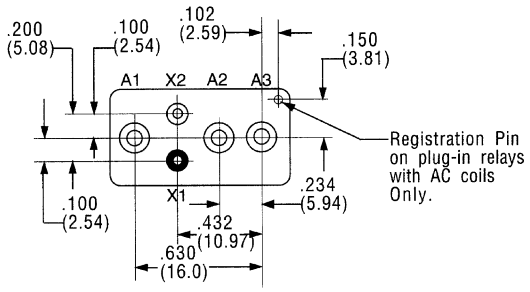
AC COILS



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.



TERMINAL VIEW

HOW TO ORDER

FCA-125-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

* 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.

Catalog 5-1773450-5
Revised 3-13

www.te.com

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

Dimensions are in millimeters unless otherwise specified.

USA: +1 800 522 6752
Asia Pacific: +86 0 400 820 6015
UK: +44 800 267 666

For additional support numbers please visit www.te.com

FCA-325 Series, 25 Amperes, 3PDT

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**

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

Contact Rating — Amperes Ratings Are Continuous Duty

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

*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 VOLTS
End of Life — 0.175 VOLTS

General Specifications

Temperature Rating —
-70˚C TO + 125˚C

Altitude — 300,000 Feet

Shock* —
Z, Y, & V Enclosures —
200 g for 6 mS
W, X & M Enclosures —
100 g for 6 mS

Vibration, Sinusoidal* —
Z, Y, & V Enclosures —
30 g 33-3000Hz
W, X & M Enclosures —
20 g 33-3000Hz

Vibration, Random* —
Z, Y, & V Enclosures —
0.4 g^2/Hz 50-2000Hz
W, X & M Enclosures —
0.2 g^2/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

Coil Code	Nominal Voltages	Freq. Hz	DC Res. AC Amps (B)	Over Temperature Range		
				Pickup or Below Volts	Dropout or Above Volts	Must Hold Voltage (C)
1	6	DC	18 Ω	4.5	0.3	2.5
2	12	DC	70 Ω	9.0	0.75	4.5
3	28	DC	290 Ω	18.0	1.5	7.0
4 (A)	28	DC	290 Ω	18.0	1.5	7.0
5	48	DC	865 Ω	32.0	2.5	14.0
6	28	400Hz	225 mA	22.0	1.25	10.0
7	28	50/400Hz	120 mA	22.0	1.25	10.0
8	115	400 Hz	40 mA	90.0	5.0	40.0
9	115	50/400 Hz	30 mA	95.0	5.0	40.0

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.

Catalog 5-1773450-5
Revised 3-13

www.te.com

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

Dimensions are in millimeters unless otherwise specified.

USA: +1 800 522 6752
Asia Pacific: +86 0 400 820 6015
UK: +44 800 267 666

For additional support numbers please visit www.te.com

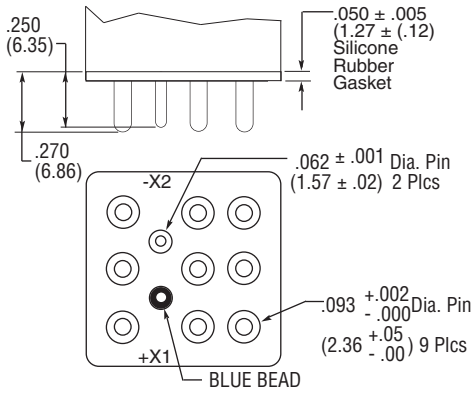
FCA-325 Series, 25 Amperes, 3PDT (Continued)

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

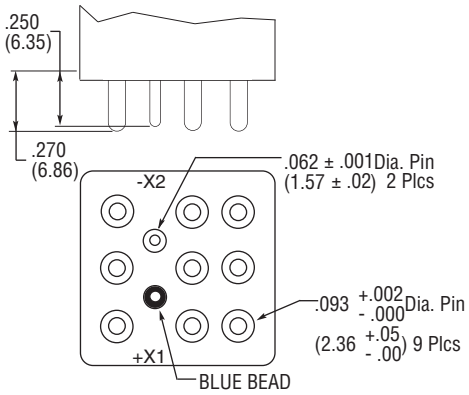
CODE "A" Socket Pins - All DC Coils

PIN TERMINALS ARE GOLD PLATED



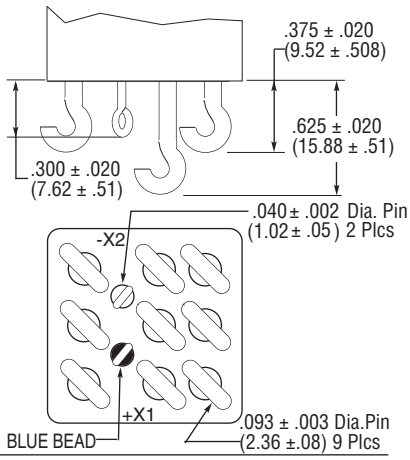
CODE "B" Solder Pin Terminals

PIN TERMINALS TIN/LEAD PLATED

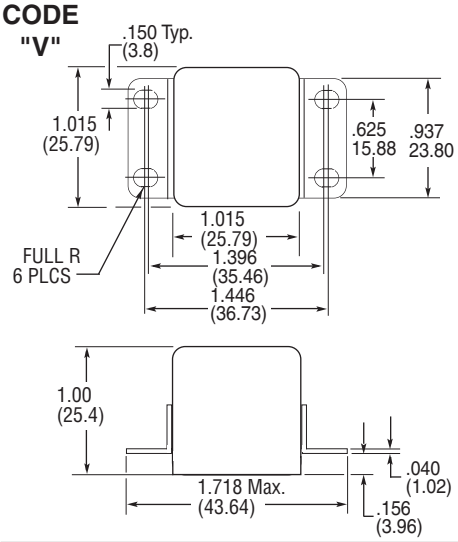


CODE "C" Solder Hook Terminals

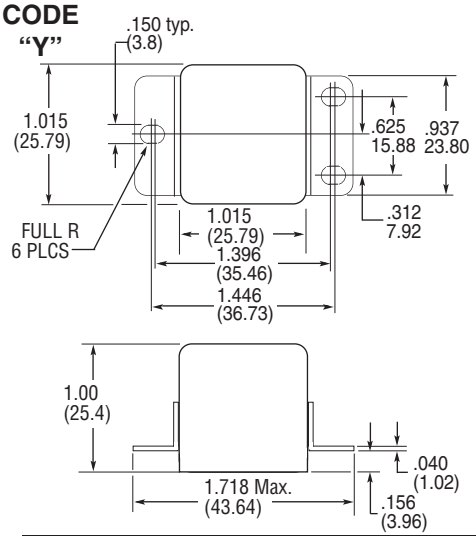
HOOK TERMINALS TIN/LEAD PLATED



CODE "V"



CODE "Y"



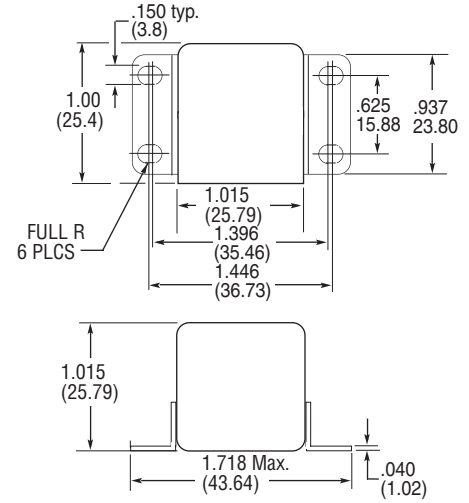
Enclosures

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

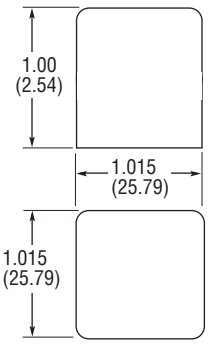
Dimensions: Inches ± .010 (mm ± .25)

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

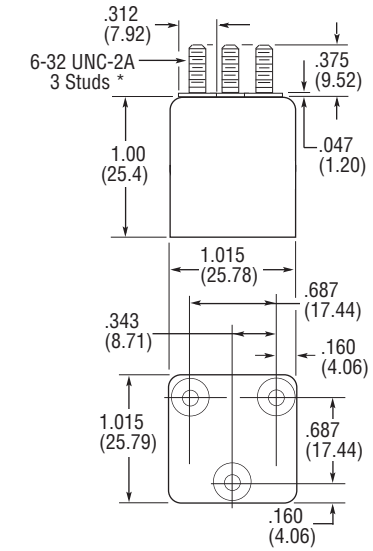
CODE "X"



CODE "Z"



CODE "W"



*Metric threads available,To specify use M in place of W

Catalog 5-1773450-5
Revised 3-13

www.te.com

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Dimensions are in millimeters unless otherwise specified.

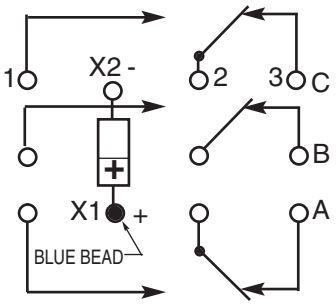
USA: +1 800 522 6752
Asia Pacific: +86 0 400 820 6015
UK: +44 800 267 666

For additional support numbers please visit www.te.com

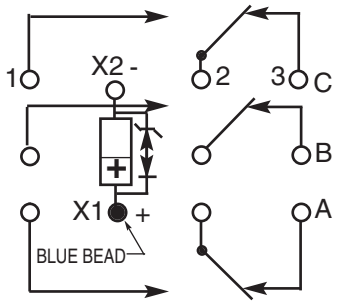
FCA-325 Series, 25 Amperes, 3PDT (Continued)

Terminal Wiring

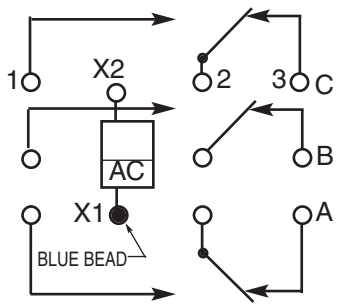
DC Coils



DC Coils with Transient Suppression



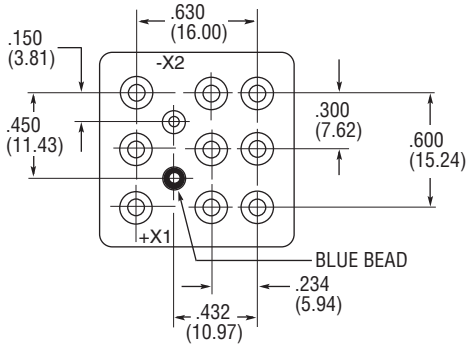
AC Coils



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.



TERMINAL VIEW

HOW TO ORDER

FCA-325-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

* 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.

Catalog 5-1773450-5
Revised 3-13

www.te.com

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

Dimensions are in millimeters unless otherwise specified.

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UK: +44 800 267 666

For additional support numbers please visit www.te.com

FCAC-325 Series, 25 Amperes, 3PST-NO with 2 Amp SPDT Auxiliary Contacts

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)**

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 3PDT Relay

Contact Rating — Amperes Ratings Are Continuous Duty

Type of Load	Life (Min.) Cycles x10³	28 VDC Main	28 VDC Aux.	115VAC 400Hz Main	115VAC 400Hz Aux.	115/200VAC 400Hz-3Ø	115/200VAC 60Hz-3Ø*
Resistive	50	25	2	25	2	25	2.5
Inductive	10	12	1	—	—	—	2.5
Inductive	20	—	—	15	1	15	—
Motor	50	10	—	10	—	10	2.0
Lamp	50	5	.5	5	.5	.5	1.0

*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

General Specifications

Temperature Rating —
-70˚C TO + 125˚C

Altitude — 300,000 Feet

Shock* —
Z, Y, & V Enclosures —
200 g for 6 mS
W, X & M Enclosures —
100 g for 6 mS

Vibration, Sinusoidal* —
Z, Y, & VEnclosures —
30 g 33-3000Hz
W, X & M Enclosures —
20 g 33-3000Hz

Vibration, Random* —
Z, Y, & V Enclosures —
0.4 g^2/Hz 50-2000Hz
W, X & M Enclosures —
0.2 g^2/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 — 10 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

Coil Code	Nominal Voltages	Freq. Hz	DC Res. AC Amps (B)	Over Temperature Range Pickup or Below Volts	Over Temperature Range Dropout or Above Volts	Over Temperature Range Must Hold Voltage (C)
1	6	DC	18 Ω	4.5	0.3	2.5
2	12	DC	70 Ω	9.0	0.75	4.5
3	28	DC	290 Ω	18.0	1.5	7.0
4 (A)	28	DC	290 Ω	18.0	1.5	7.0
5	48	DC	865 Ω	32.0	2.5	14.0
6	28	400Hz	225 mA	22.0	1.25	10.0
7	28	50/400Hz	120 mA	22.0	1.25	10.0
8	115	400 Hz	40 mA	90.0	5.0	40.0
9	115	50/400 Hz	30 mA	95.0	5.0	40.0

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.

Catalog 5-1773450-5
Revised 3-13

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

Dimensions are in millimeters unless otherwise specified.

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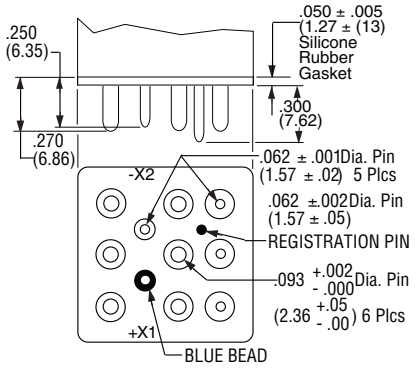
For additional support numbers please visit www.te.com

FCAC-325 Series (Continued)

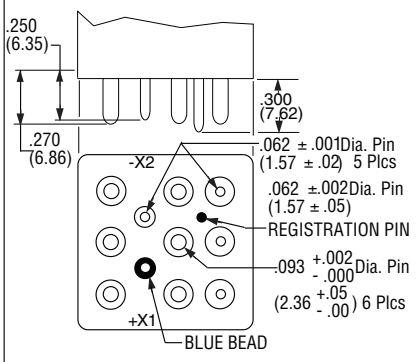
Below are shown the standard terminal types and the enclosures available. Specify the assembly as indicated under How To Order. Dimensions are shown in inches ± .010 and (Millimeters ± .25).

Terminals

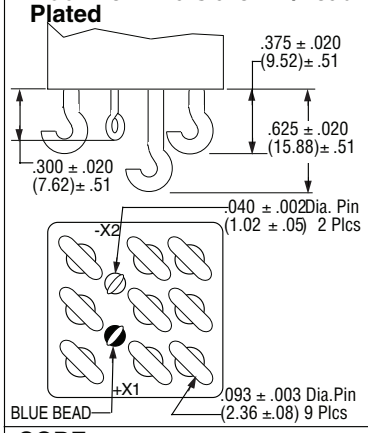
CODE "A"
Socket Pin Terminals
Pin Terminals are Gold Plated



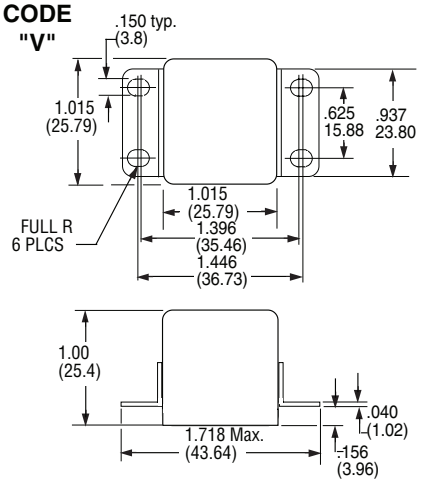
CODE "B"
Solder Pin Terminals
Pin Terminals are Tin/Lead Plated



CODE "C"
Solder Hook Terminals
Hook Terminals are Tin/Lead Plated



CODE "V"



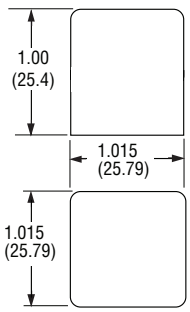
ENCLOSURES

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

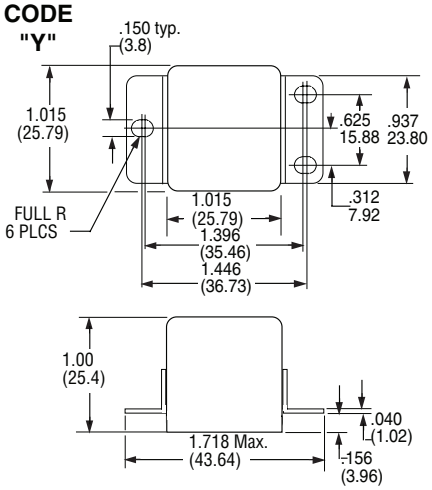
Dimensions: Inches ± .010 (mm ± .25)

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

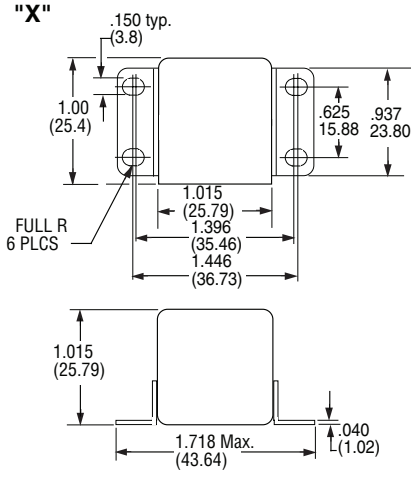
CODE "Z"



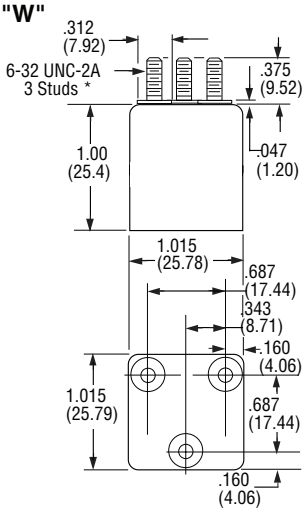
CODE "Y"



CODE "X"



CODE "W"



*Metric threads available, To specify use M in place of W

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Revised 3-13

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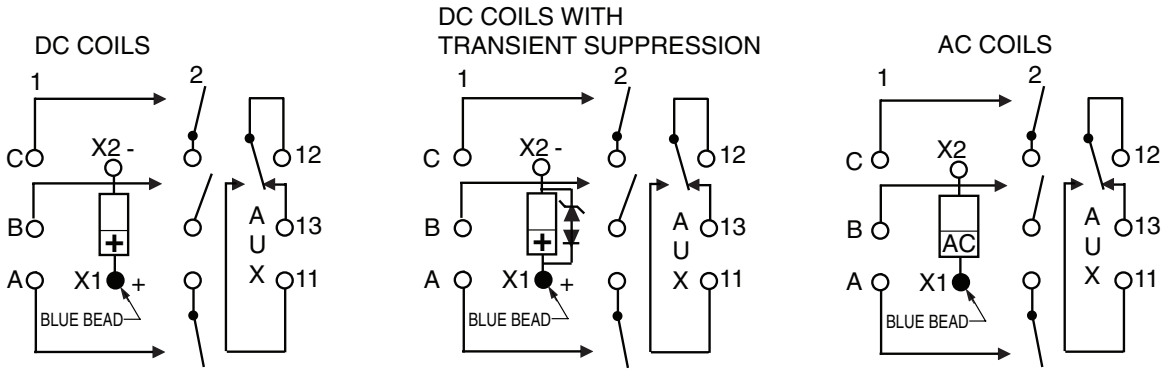
FCAC-325 Series (Continued)

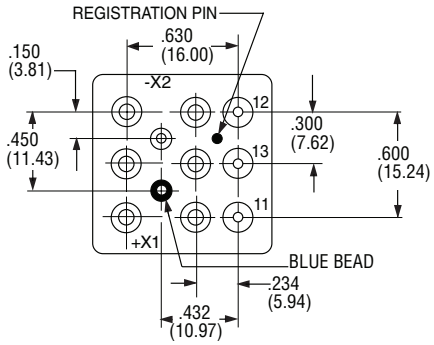
Terminal Wiring



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.



TERMINAL VIEW

HOW TO ORDER

FCAC-325 -A Y 4

RELAY TYPE

TERMINALS (Socket Pins, DC Coil)

ENCLOSURE (With Flanges and DC Coil)

COIL (28 VDC With Transient Suppression)

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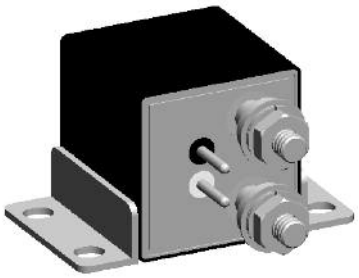
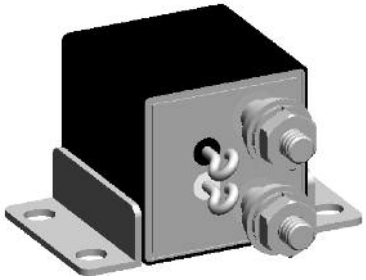
FCA-150 Series, 50 Amps, 1PST/NO (DM) Relay

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.

1 Form X (SPST-NO-DM) configuration with main contacts rated 50 Amps.

Specifications

Contact Data				
Contact Form	1 Form X (SPST-NO-DM)			
Contact Rating in Amps (Continuous Duty)				
	Type of Load	Life (Min.) Cycles	28 Vdc	
	Resistive	50,000	50	
	Inductive (L/R=5ms)	20,000	20	
	Motor	20,000	20	
	None	100,000	–	
Overload Current (Resistive)	200 A, 50 cycles			
Max. Contact Drop at 10A	Initial 30mV; After Life 175mV			
Operate Time at Nominal Voltage	15ms			
Release Time	15ms			
Bounce Time	1ms			
Coil Data				
Coil Code	1	2	3	4
Nominal Operating Voltage (Vdc)	6	12	28	28
Maximum Operating Voltage (Vdc)	7.3	14.5	29	29
Maximum Pick-Up Voltage at +125°C	4.5	9	18	18
Maximum Pick-Up Voltage at +125°C, continuous current test (Vdc)	5.7	11.25	22.5	22.5
Drop-Out Voltage at OTR	0.3 – 2.5	0.75 – 4.5	1.5 – 7.0	1.5 – 7.0
Maximum Coil Current at +25°C (A)	.50	.26	.15	.15
Back EMF Suppressed to (Vdc) (Max)	N/A	N/A	N/A	-42
Coil Resistance ±10%	18Ω	70Ω	290Ω	290Ω

Catalog 5-1773450-5
Revised 3-13

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For additional support numbers please visit www.te.com

FCA-150 Series, 50 Amps, 1PST/NO (DM) Relay (Continued)

Specifications

Electrical Data	
Initial Insulation Resistance (note 1)	100 megohms, minimum, at 500Vdc, between each pin and case
Insulation Resistance After Life or Environmental Test (note 1)	50 megohms, minimum, at 500Vdc, between each pin and case
Dielectric Strength At Sea Level	
Contacts to Ground and Between Contacts	1,250Vrms, 60 Hz.
Coil to Ground	1,000Vrms, 60 Hz.
Dielectric Strength at 80,000 ft (25,000m), All Points (note 4)	500Vrms, 60 Hz
Environmental Data	
Ambient Temperature Range, Operating	-70°C to +125°C
Altitude	300,000 feet
Shock Resistance	50 G's, 11 ms.
Vibration Resistance, Sinusoidal	20 G's, 75-3000Hz.
Mechanical Data	
Approximate Weight	3.2 oz. (90g) Max.

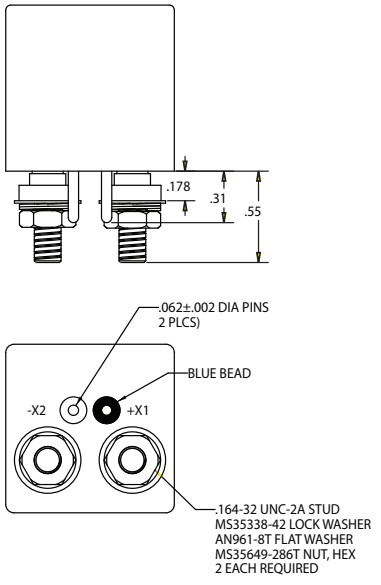
NOTES

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

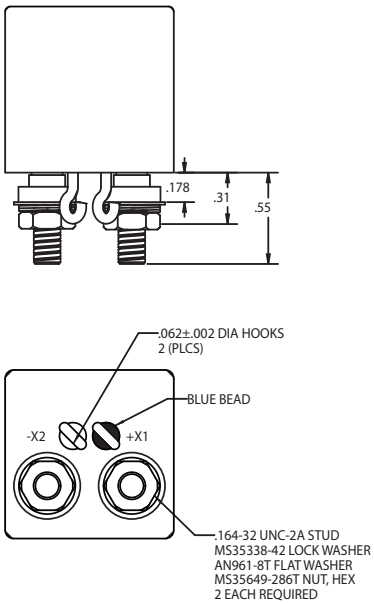
CODE "B"

Solder Pin Terminals
Tin/Lead Plated



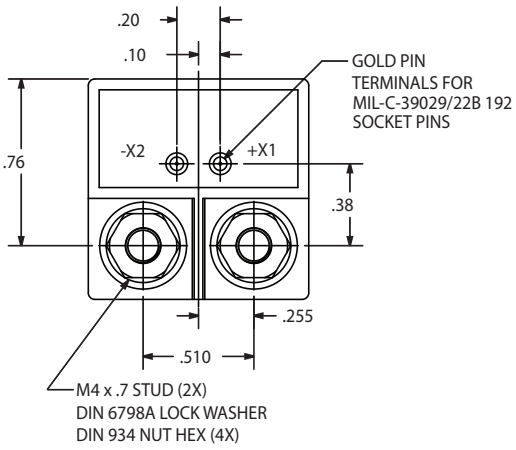
CODE "C"

Solder Hook Terminals
Tin/Lead Plated



CODE "K"

Terminal Shield



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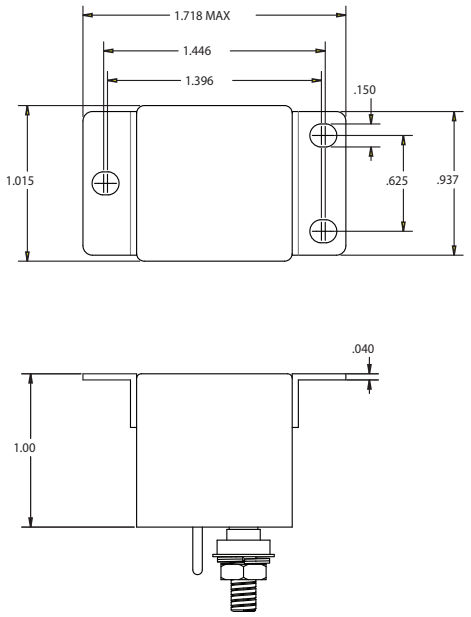
FCA-150 Series, 50 Amps, 1PST/NO (DM) Relay (Continued)

Outline Dimensions

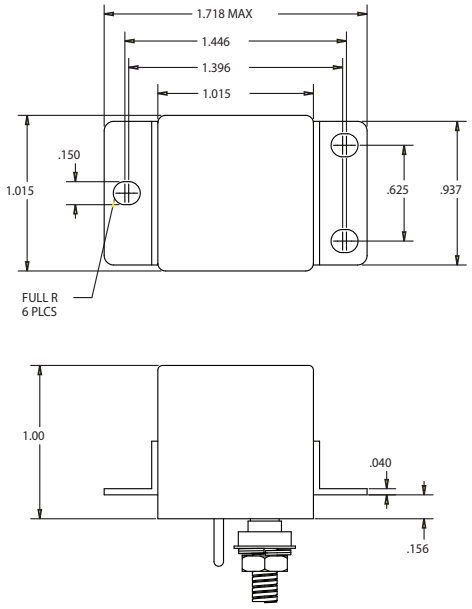
The standard terminal types and enclosures are illustrated below with dimensions in inches ± 0.010 and (millimeters ±0.25).

Enclosures

CODE "U"



CODE "Y"



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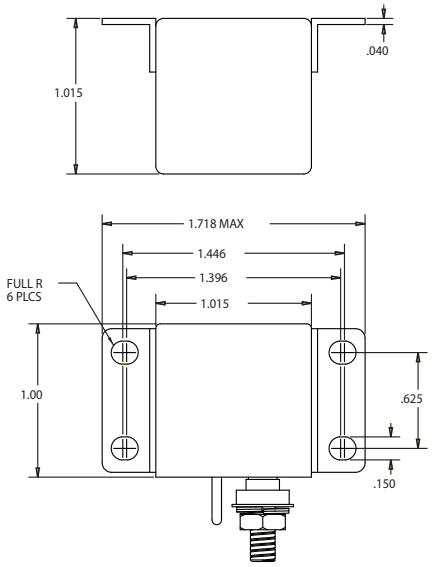
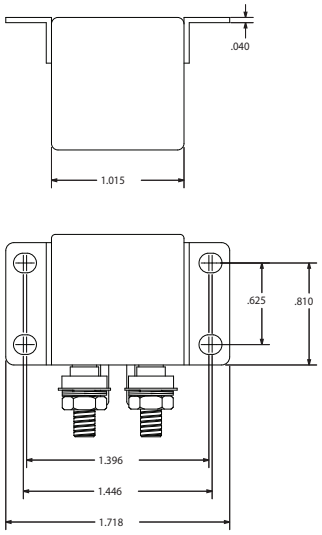
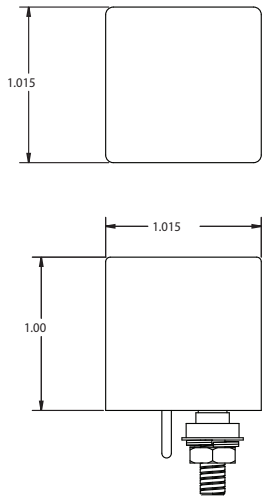


CODE "R"



CODE "Z"



Catalog 5-1773450-5
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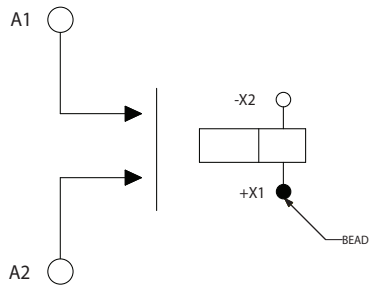
For additional support numbers please visit www.te.com

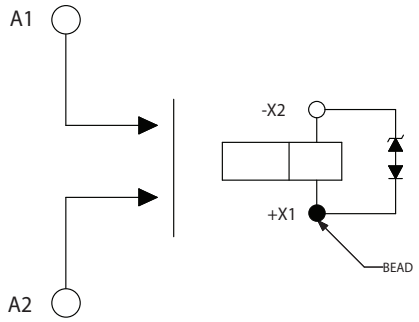
FCA-150 Series, 50 Amps, 1PST/NO (DM) Relay (Continued)

Terminal Wiring

DC Coils



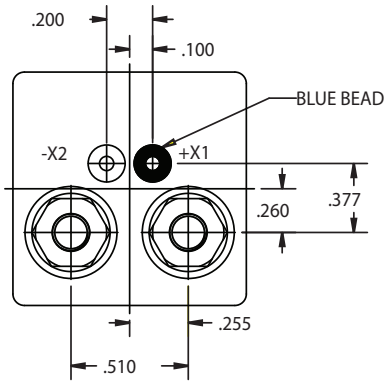
DC Coils with Transient Suppression



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.



TERMINAL VIEW

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
Y = Raised Vertical Flange Mount
U = Flush Vertical Flange Mount
Z = No Mount
X = Horizontal Flange Mount

Coil:
1 = 6Vdc nominal
2 = 12Vdc nominal
3 = 28Vdc nominal
4 = 28Vdc nominal, with back EMF suppression

Catalog 5-1773450-5
Revised 3-13

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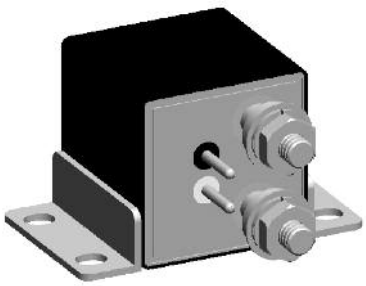
UK: +44 800 267 666

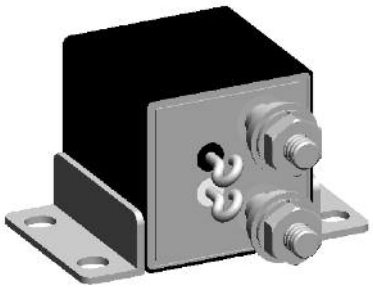
For additional support numbers please visit www.te.com

FCA-150NC Series, 50 Amps, 1PST/NC (DB) Relay

Product Facts

- **Non latching hermetically sealed relay**
- **Balanced force design**
- **Hermetically sealed, corrosion protected metal can**
- **All welded construction**
- **6, 12 and 28Vdc coils available.**
- **Weight 90 grams**
- **Designed and built in accordance to MIL-PRF-6106**





Specifications

General Characteristics				
Temperature range			-70° C to +125° C	
Altitude			300,000 feet	
Dielectric strength at sea level - Contacts to ground and between contacts - Coil to ground			 1250 Vrms / 60 Hz 1000 Vrms / 60 Hz	
Dielectric strength at altitude 25000 m (80,000 ft) (all points)			500 Vrms / 60 Hz	
Initial insulation resistance at 500 Vdc			100 MΩ min.	
Initial insulation after life or environmental test			50 MΩ min.	
Sinusoidal vibration			20g / 75 to 3000 Hz	
Shock			50g / 11 ms	
Operate time at nominal voltage			15 ms max.	
Release time			15 ms max.	
Bounce time			1 ms max.	
Contact voltage drop at nominal current -initial value -after life			 150 mV max. 175 mV max.	
Coil Data				
Coil Code	1	2	3	4(A)
Nominal Operating Voltage (Vdc)	6	12	28	28
Maximum Operating Voltage (Vdc)	7.3	14.5	29	29
Maximum Pick-Up Voltage at +125°C	4.5	9	18	18
Maximum Pick-Up Voltage at +125°C, continuous current test (Vdc)	5.7	11.25	22.5	22.5
Drop-Out Voltage at OTR	0.3 – 2.5	0.75 – 4.5	1.5 – 7.0	1.5 – 7.0
Maximum Coil Current at +25°C (mA)	.50	.26	.15	.15
Back EMF Suppressed to (Vdc)	N/A	N/A	N/A	-42
Coil Resistance	18Ω	70Ω	290Ω	290Ω

For other coil voltages, consult factory.

Catalog 5-1773450-5
Revised 3-13

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For additional support numbers please visit www.te.com

FCA-150NC Series, 50 Amps, 1PST/NC (DB) Relay (Continued)

Contact Electrical Characteristics

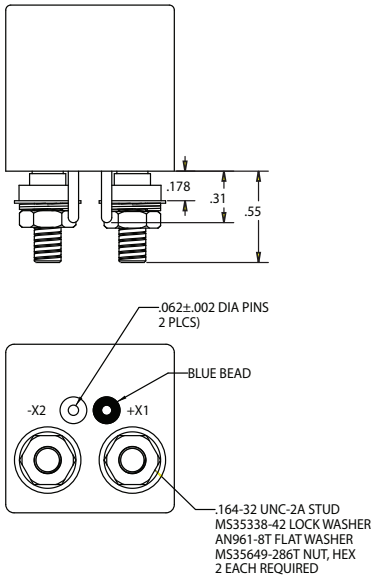
Contact Type	Rated Current	Rated Voltage
Main Contact	50A	28Vdc
Minimum Operating cycles	**Contact rating per pole and load type MAIN Contact**	**Load Currents in Amps**
50,000 cycles	Resistive load	50
20,000 cycles	Inductive load (L/R=5ms)	20
20,000 cycles	Motor load	20
50 cycles	Resistive overload	200
100,000 cycles	No Load	

All endurance ratings are subject to validation - consult factory

Terminals

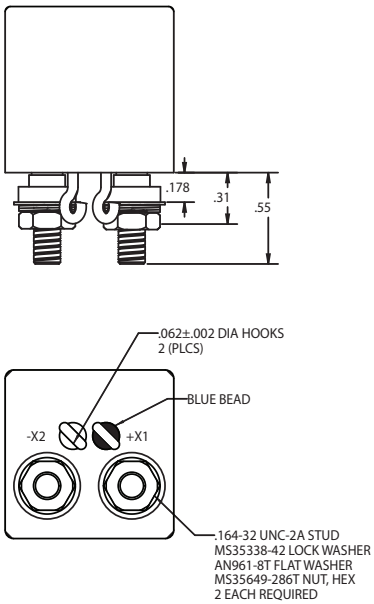
CODE "B"

Solder Pin Terminals
Tin/Lead Plated



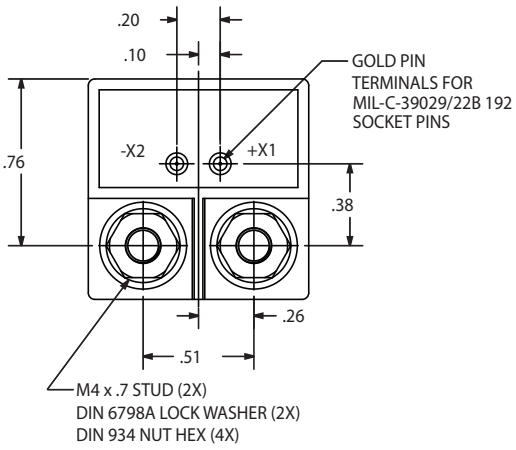
CODE "C"

Solder Hook Terminals
Tin/Lead Plated



CODE "K"

Terminal Shield



Catalog 5-1773450-5
Revised 3-13

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

Dimensions are in millimeters unless otherwise specified.

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For additional support numbers please visit www.te.com

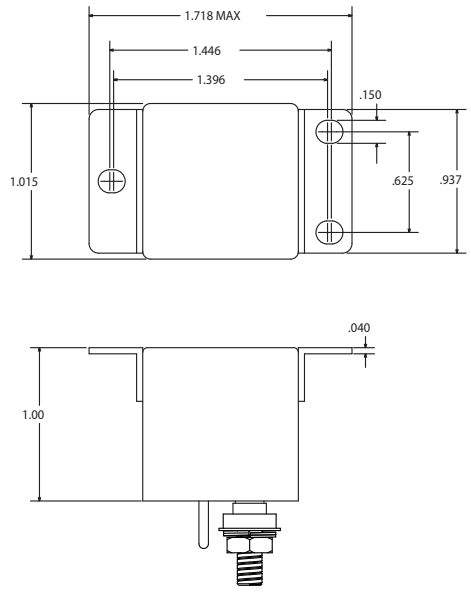
FCA-150NC Series, 50 Amps, 1PST/NC (DB) Relay (Continued)

Outline Dimensions

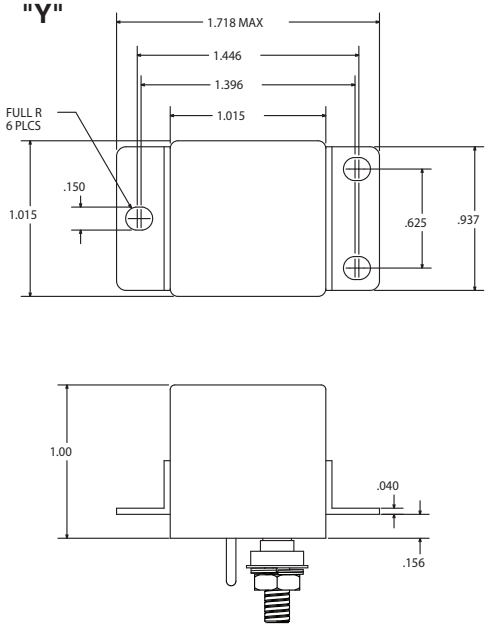
The standard terminal types and enclosures are illustrated below with dimensions in inches ± 0.010 and (millimeters ±0.25).

Enclosures

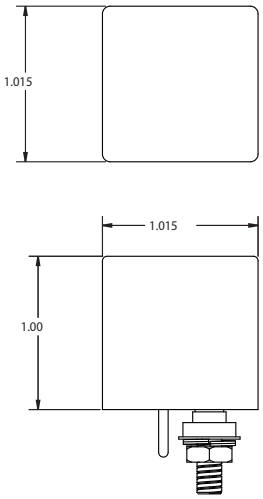
CODE "U"



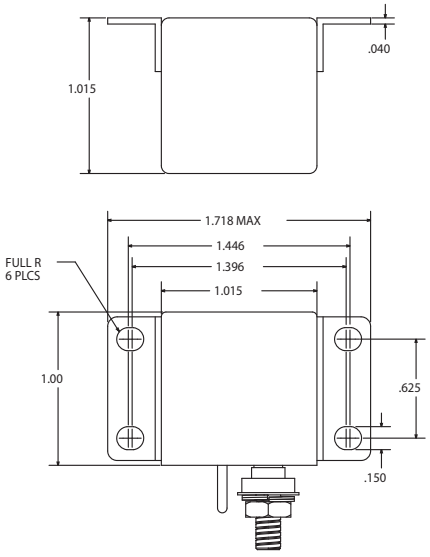
CODE "Y"



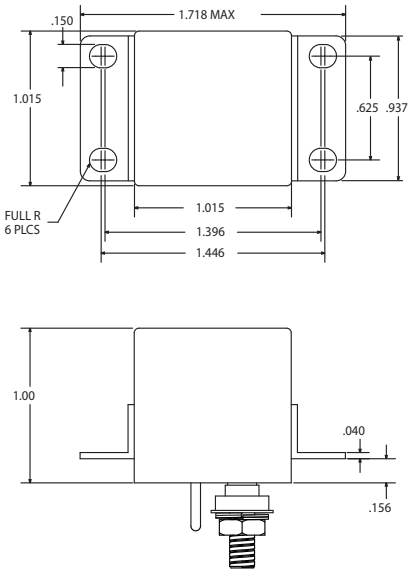
CODE "Z"



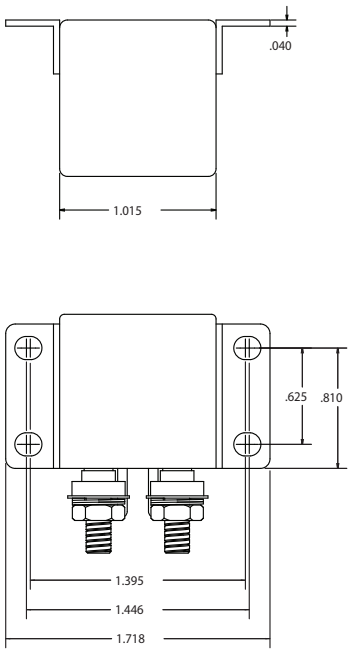
CODE "X"



CODE "V"



CODE "R"



Catalog 5-1773450-5
Revised 3-13

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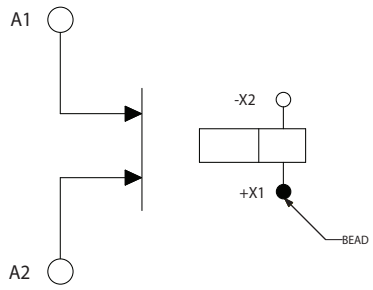
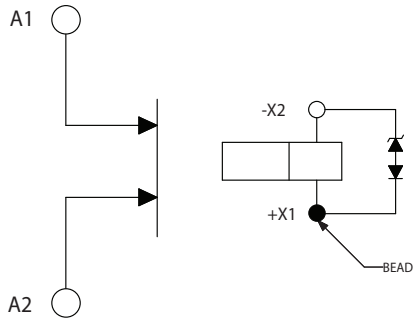
FCA-150NC Series, 50 Amps, 1PST/NC (DB) Relay (Continued)

Terminal Wiring

DC Coils



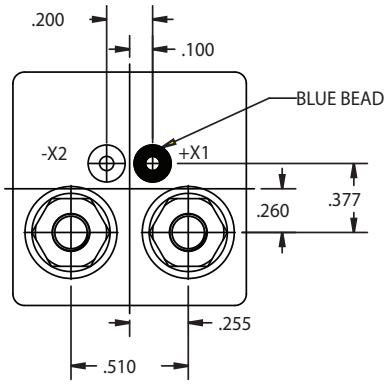
DC Coils with Transient Suppression



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.



TERMINAL VIEW

PART NUMBERING SYSTEM

FCA - 150NC	B	Y	4

RELAY TYPE

TERMINALS

ENCLOSURE

COIL

Catalog 5-1773450-5
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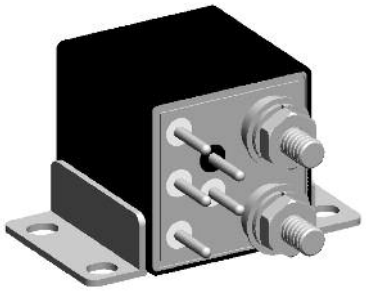
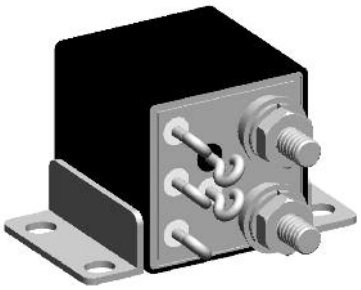
FCAC-150 Series, 50 Amps, 1PST/NO (DM) with 1PDT Auxiliary Contacts

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 C (SPDT) auxiliary contact**
- **6, 12 and 28 Vdc coils**
- **Weight: 90 grams**
- **Designed and built in accordance to MIL-PRF-6106**





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 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.

A 1 form C (SPDT) auxiliary contact set rated 2 amps is available.

Specifications

Auxiliary Contact Data

Contact Form	1 Form X (SPDT-NO-DM) with 1 Form C (SPDT) Auxiliary			
Contact Rating in Amps (Continuous Duty)				
	Type of Load	Life (Min.) Cycles	28 Vdc	115 Vac 400Hz
	Resistive	50,000	50	50
	Inductive (L/R=5ms)	20,000	20	20
	Motor	20,000	20	20
	None	100,000	–	–

Coil Data

Coil Code	1	2	3	4(A)
Nominal Operating Voltage (Vdc)	6	12	28	28
Maximum Operating Voltage (Vdc)	7.3	14.5	29	29
Maximum Pick-Up Voltage at +125°C	4.5	9	18	18
Maximum Pick-Up Voltage at +125°C, continuous current test (Vdc)	5.7	11.25	22.5	22.5
Drop-Out Voltage at OTR	0.3 – 2.5	0.75 – 4.5	1.5 – 7.0	1.5 – 7.0
Maximum Coil Current at +25°C (mA)	.50	.26	.15	.15
Back EMF Suppressed to (Vdc) (max)	N/A	N/A	N/A	-42
Coil Resistance ±10%	18Ω	70Ω	290Ω	290Ω

Catalog 5-1773450-5
Revised 3-13

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For additional support numbers please visit www.te.com

FCAC-150 Series, 50 Amps, 1PST/NO (DM) with 1PDT Auxiliary Contacts (Continued)

Specifications

Electrical Data	
Initial Insulation Resistance (note 1)	100 megohms, minimum, at 500Vdc, between each pin and case
Insulation Resistance After Life or Environmental Test (note 1)	50 megohms, minimum, at 500Vdc, between each pin and case
Dielectric Strength At Sea Level	
Contacts to Ground and Between Contacts	1,250Vrms, 60 Hz.
Coil to Ground	1,000Vrms, 60 Hz.
Dielectric Strength at 80,000 ft (25,000m), All Points (note 4)	500Vrms, 60 Hz
Environmental Data	
Ambient Temperature Range, Operating	-70°C to +125°C
Altitude	300,000 feet
Shock Resistance	50 G's, 11 ms.
Vibration Resistance, Sinusoidal	20 G's, 75-3000Hz.
Mechanical Data	
Approximate Weight	3.2 oz. (90g) Max.

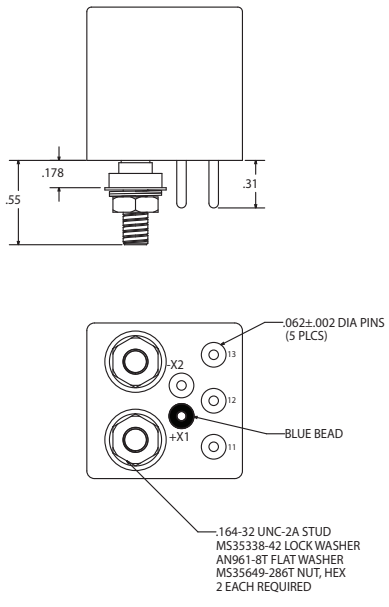
NOTES

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

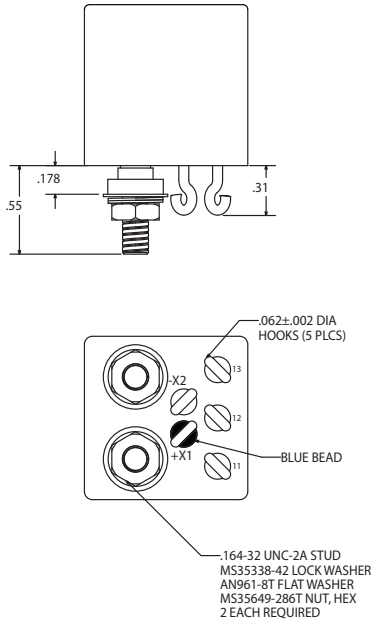
CODE "B"

Solder Pin Terminals
Tin/Lead Plated



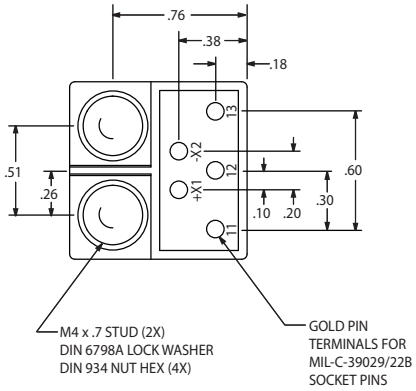
CODE "C"

Solder Hook Terminals
Tin/Lead Plated



CODE "K"

Terminal Shield



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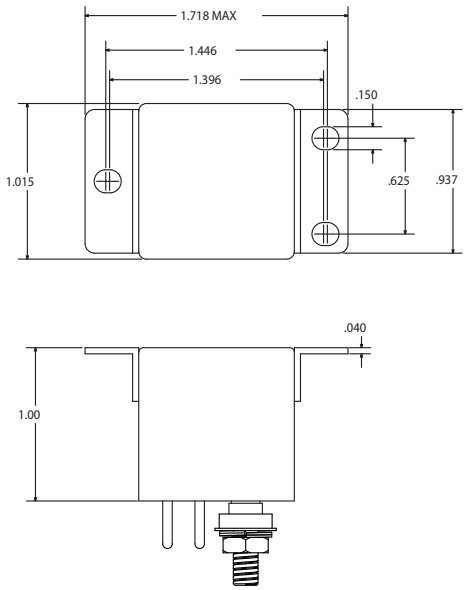
FCAC-150 Series, 50 Amps, 1PST/NO (DM) with 1PDT Auxiliary Contacts (Continued)

Outline Dimensions

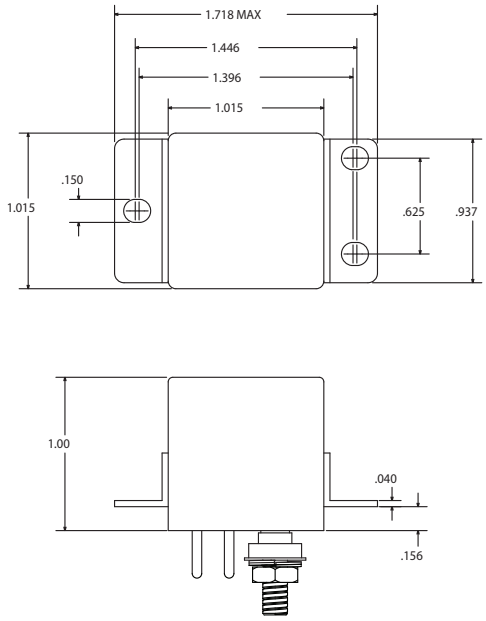
The standard terminal types and enclosures are illustrated below with dimensions in inches ± 0.010 and (millimeters ±0.25).

Enclosures

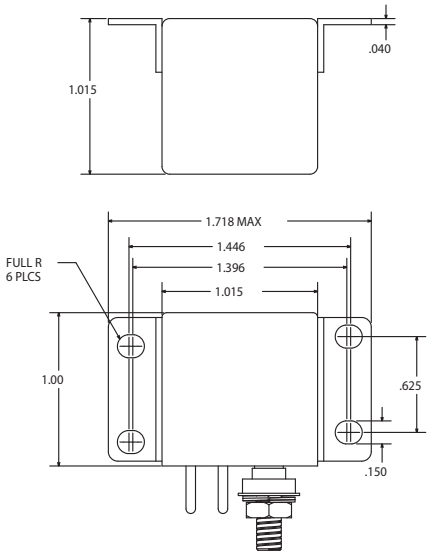
CODE "U"



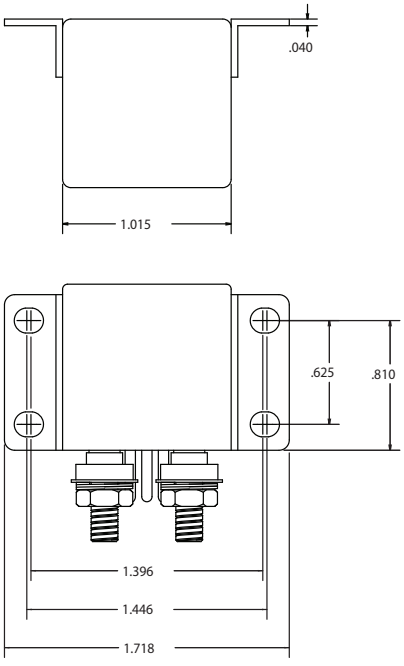
CODE "Y"



CODE "X"



CODE "R"



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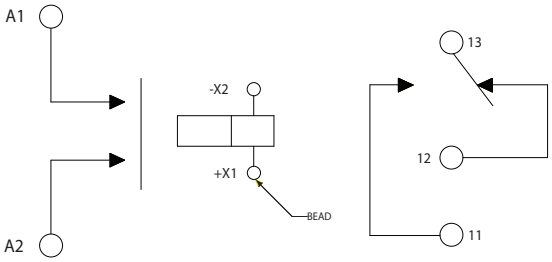
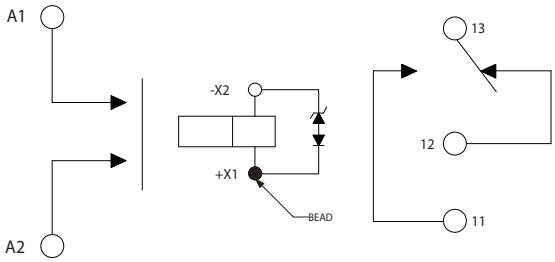
FCAC-150 Series, 50 Amps, 1PST/NO (DM) with 1PDT Auxiliary Contacts (Continued)

Terminal Wiring

DC Coils



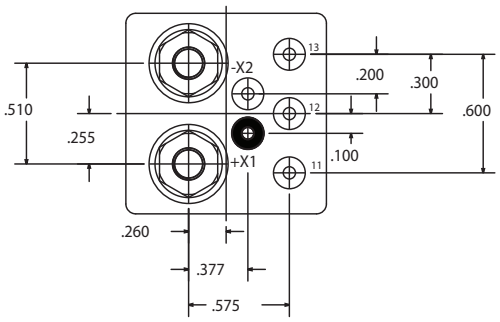
DC Coils with Transient Suppression



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.



TERMINAL VIEW

How to Order

Typical Part Number	FCAC-150	B	Y	3

Series and Contact Arrangement:
FCAC-150 = Relay with 1 Form X Main Contacts, 1 Form C Aux. 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
Y = Raised Vertical Flange Mount
U = Flush Vertical Flange Mount
Z = No Mount
X = Horizontal Flange Mount

Coil:
1 = 6Vdc nominal
2 = 12Vdc nominal
3 = 28Vdc nominal
4 = 28Vdc nominal, with back EMF suppression

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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.

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Cross Reference - Socket to Relay

NOTE:
TE Connectivity Does Not Manufacture Relay Sockets.

This Socket to Relay cross reference is provided for additional design assistance. Several of TE 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.

Military Socket P/N	Relay Part Number	Relay Type
M12883/40-01 M12883/40-05 M12883/40-07 M12883/40-11 M12883/40-13 M12883/40-17 M12883/40-19 M12883/40-23	M83536/15-022 M83536/16-006, 014, 031, 034	4 Pole, 10 Amp
M12883/40-02 M12883/40-08 M12883/40-14 M12883/40-20	FCA-410-DY8 (Catalog Version) FCA-410-DY9 (Catalog Version)	4 Pole, 10 Amp, AC
M12883/41-01 M12883/41-04 M12883/41-06 M12883/41-09 M12883/41-11 M12883/41-14 M12883/41-16 M12883/41-19	M83536/9-006, 015, 024, 035 M83536/10-006, 015, 024, 034, 038	2 Pole, 10 Amp
M12883/41-02 M12883/41-07 M12883/41-12 M12883/41-17	FCA-210-DY8 (Catalog Version) FCA-210-DY9 (Catalog Version)	2 Pole, 10 Amp, AC
M12883/44-01	M83536/5-006, 014, 022, 030 M83536/6-006, 014, 022, 032	4 Pole, 5 Amp
M12883/45-01	M83536/1-006, 015, 024, 033 M83536/2-006, 015, 024, 035	2 Pole, 5 Amp
M12883/47-01 M12883/47-04 M12883/47-07 M12883/47-10	FCA-610-AY3 (Catalog Version) FCA-610-AY4 (Catalog Version)	6 Pole, 10 Amp
M12883/47-02 M12883/47-05 M12883/47-08 M12883/47-11	FCA-610-DY8 (Catalog Version)	6 Pole, 10 Amp AC
M12883/48-01 M12883/48-02 M12883/48-03 M12883/48-04	M83536/32-003L M83536/33-003L	3 Pole, 25 Amp
M12883/48-05 M12883/48-06 M12883/48-07 M12883/48-08	FCA-325-AV8 (Catalog Version) FCA-325-AV9 (Catalog Version)	3 Pole, 25 Amp AC
M12883/52-01	M83536/2-028	2 Pole, 5 Amp Track Mount
M12883/52-02	M83536/6-025	4 Pole, 5 Amp Track Mount
M12883/55-01 M12883/55-02	M6106/19-004, 007, 012, 017, 022	1 Pole, 25 Amp

Catalog 5-1773450-5
Revised 3-13

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Engineering Notes

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OCEAN CHIPS
Океан Электроники
Поставка электронных компонентов

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «**JONHON**», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «**FORSTAR**».

AVIC JONHON

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