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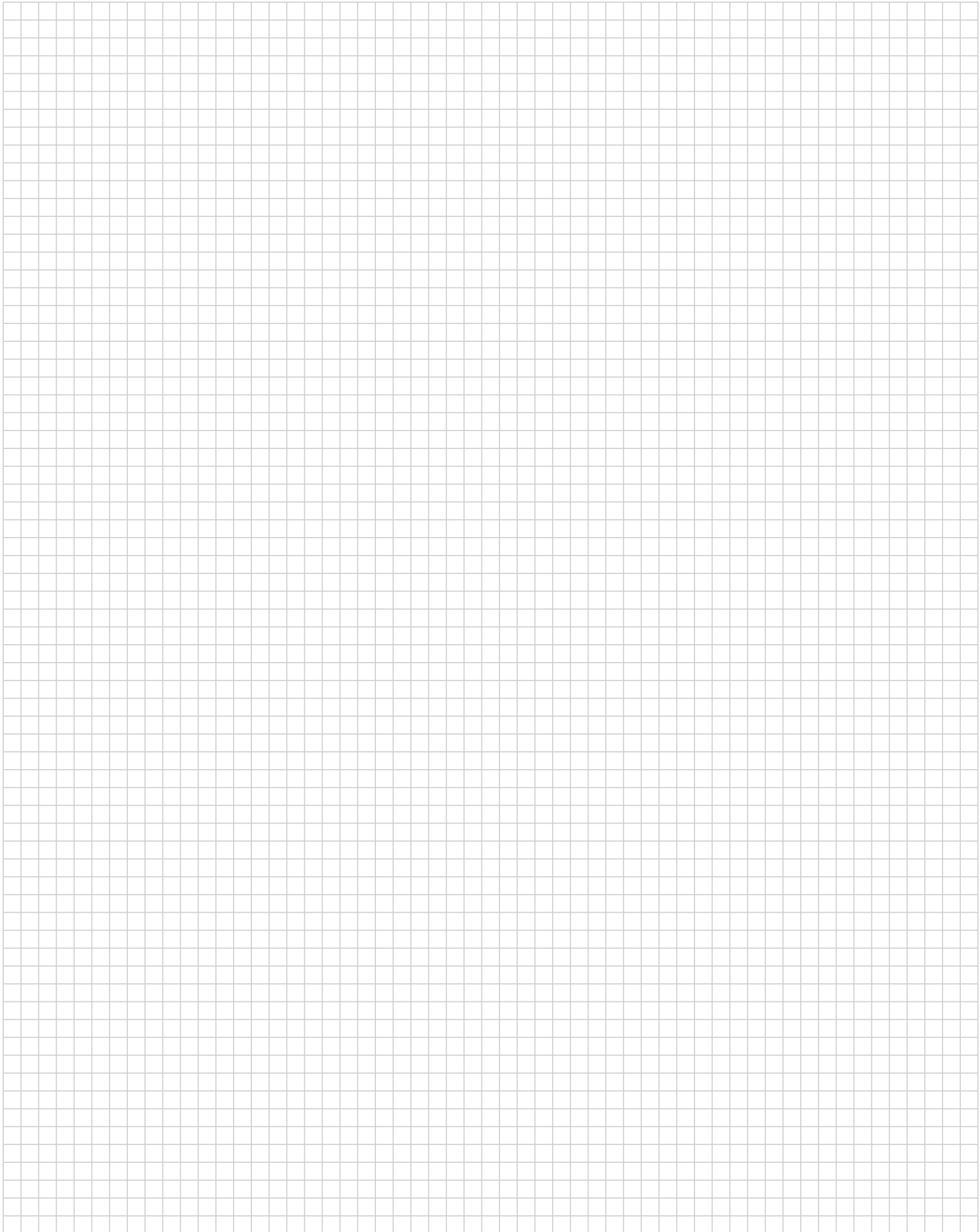
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**Engineering Notes**

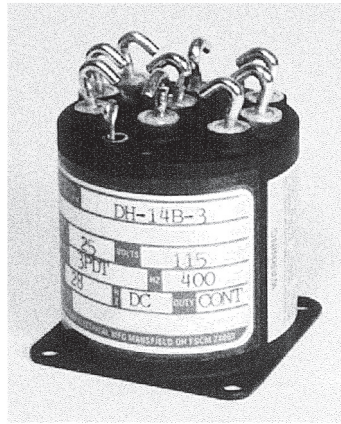
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**DH-14 and DHR-14 Series Contactors, Rated up to 25 Amps,  
115/200 VAC, 400 Hz**

**Product Facts**

- 3PDT
- Hermetically sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



**Performance Data**

**Electrical Characteristics**

- Contact Arrangement** — 3PDT
- Rated Operating Voltage** — 115/200 VAC, 400 Hz
- Resistive Rating** — 25 Amps
- Inductive Rating** — 20 Amps
- Motor Rating** — 15 Amps

**General Characteristics**

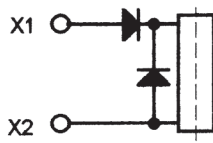
- Temperature Range** — -55°C to +71°C
- Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles
- Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles
- Dielectric Strength** — All Circuits to Ground — 1,500 Vrms  
Circuit to Circuit — 1,500 Vrms  
Coil to Ground and Aux. Contacts — 1,000 Vrms
- Insulation Resistance, Initial** — 100 megohm min.
- Altitude** — 80,000 ft.
- Weight, Max.** — .41 to .50 lbs

**Duty Cycle** —

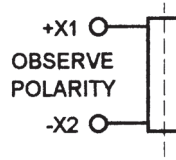
- VAC 400 Hz — AC Continuous (Type A, See diagram below)
- Vdc — Continuous or continuous with suppression (See diagram B & C below)
- Operating Voltage, Nom.** — VAC 400 Hz — 115 VAC  
Vdc — 28 Vdc
- Pickup Voltage @ 25°C, Max.** — VAC 400 Hz — 95 VAC  
Vdc — 18 Vdc
- Dropout Voltage @ 25°C, Max.** — VAC 400 Hz — 25 VAC  
Vdc — 1.5 to 7 Vdc
- Coil Resistance ±20% @ 25°C** — VAC 400 Hz — N/A  
Vdc — 290 Ohms

**Coil Characteristics**

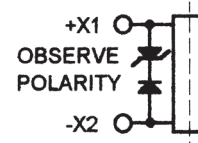
**Coil Type**



A — AC Continuous



B — Continuous



C — Continuous with Suppression

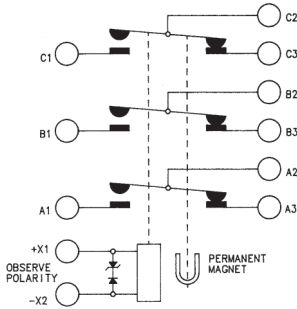
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.



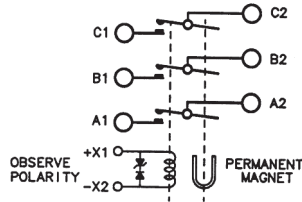


**DH-14 and DHR-14 Series Contactors, Rated up to 25 Amps,  
115/200 VAC, 400 Hz (Continued)**

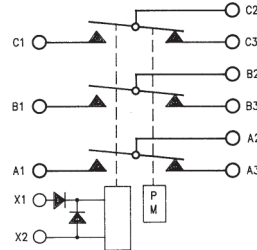
**Circuit Configurations** (Consult factory for other available circuit configurations)



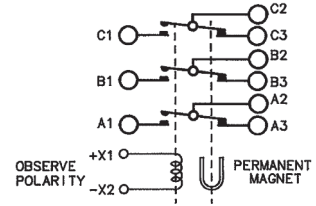
Circuit Configuration 1



Circuit Configuration 2



Circuit Configuration 3



Circuit Configuration 4

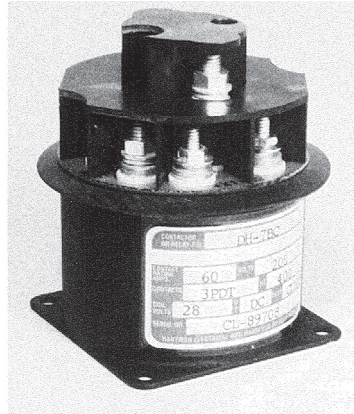
HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Connectivity Part Number
DH-14B	Hermetically Sealed	C	B	4	1-1616522-4
DH-14B-3	Hermetically Sealed	A	C	1	1616037-1
DH-14CE	Hermetically Sealed	A	C	2	1616017-1
DHR-14B	Hermetically Sealed	A	A	3	1-1616037-2
DHR-14BA	Hermetically Sealed	B	A	3	1-1616037-3

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

**DHR-18 Series, Rated up to 30 Amps, 115 VAC, 400 Hz**

**Product Facts**

- 3PDT, Center off
- Hermetically sealed



**Performance Data**

**Electrical Characteristics**

**Contact Arrangement** — 3PDT, Center Off

**Rated Operating Voltage** — 115 VAC, 400 Hz

**Resistive Rating** — 30 Amps

**Inductive Rating** — 20 Amps

**General Characteristics**

**Operating Temperature** — 71°C

**Weight, Max.** — 14 oz.

**Coil Characteristics**

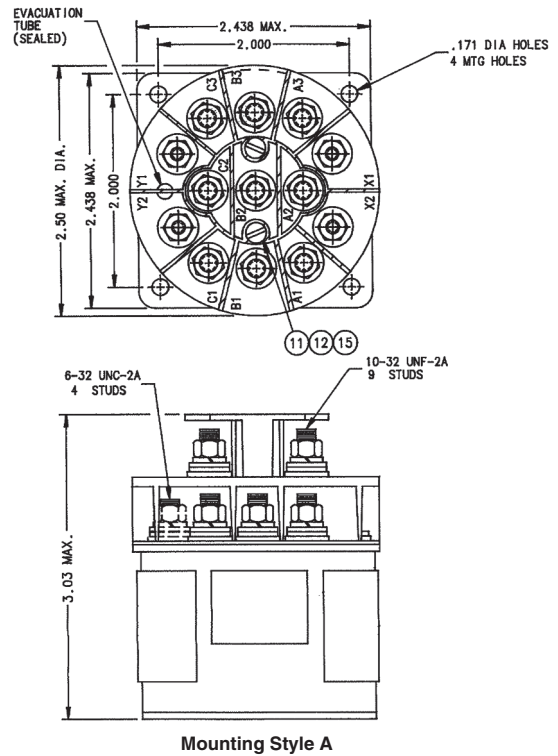
**Duty Cycle** — Continuous

**Coil Rating** — 115 VAC, 400 Hz

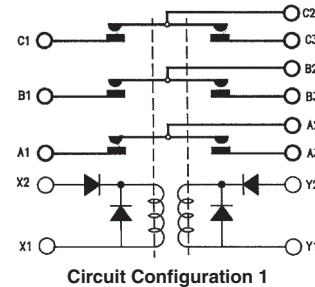
**Pickup Voltage, Max.** — 90 Vdc, Hot

**Dropout Voltage** — 45 ± 20 Vdc

**Current at 115 Vdc & 25°C** — 0.28 Amp max.



**Circuit Configurations** (Consult factory for other available circuit configurations)



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

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
DHR-18-1	Hermetically Sealed	A	Continuous	1	1616050-9

## D7, DH7, DHR7, DR7 Series, Rated up to 50 Amps, 115/200 VAC, 400 Hz

### Product Facts

- 3PDT and 3PST NO
- Gasket sealed or Hermetically sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

**Contact Arrangement** — 3PDT and 3PST NO

**Rated Operating Voltage** — 115/200 VAC, 400 Hz, 3 phase

**Resistive Rating** — 50 Amps

**Inductive Rating** — 50 Amps

**Motor Rating** — 30 Amps

**Lamp Rating** — 15 Amps

#### General Characteristics

**Temperature Range** — -55°C to +71°C

**Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles

**Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles

**Dielectric Strength** — All Circuits to Ground — 1,500 Vrms  
Circuit to Circuit — 1,500 Vrms  
Coil to Ground and Aux. Contacts — 1,000 Vrms

**Insulation Resistance, Initial** — 100 megohm min.

**Altitude** — D7, DR7 — 50,000 ft  
DH7, DHR7 — 80,000 ft

**Weight, Max.** — .94 to 1.20 lbs

#### Coil Characteristics

**Duty Cycle** — VAC 400 Hz — AC Continuous (Type A & E, See diagram below)

Vdc — Continuous (Type B, See diagram below)

Vdc — Continuous with suppression (Type C & D, See diagram below)

**Operating Voltage, Nom.** — VAC 400 Hz — 115 VAC  
Vdc — 28 Vdc

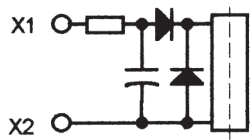
**Pickup Voltage @ 25°C, Max.** — VAC 400 Hz — 75 VAC  
Vdc — 18 Vdc

**Dropout Voltage @ 25°C, Max.** — VAC 400 Hz — 12 to 38 VAC  
Vdc — 1 to 7 Vdc

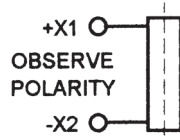
**Coil Resistance ±20% @ 25°C** — VAC 400 Hz — 505 Ohms  
Vdc — 126 Ohms

**Coil Current @ 25°C, Max.** — VAC 400 Hz — .065 Amp  
Vdc — .28 Amp

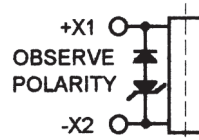
### Coil Type



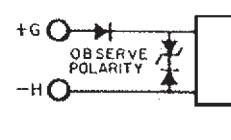
A — AC Continuous



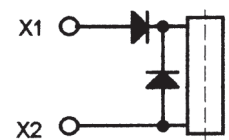
B — Continuous



C — Continuous with Suppression



D — Continuous with Suppression

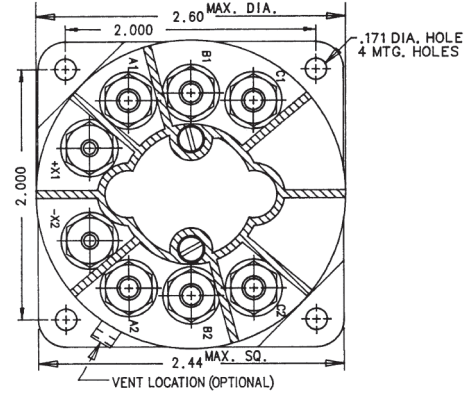
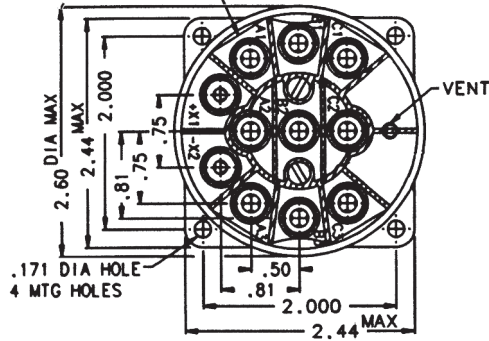


E — AC Continuous

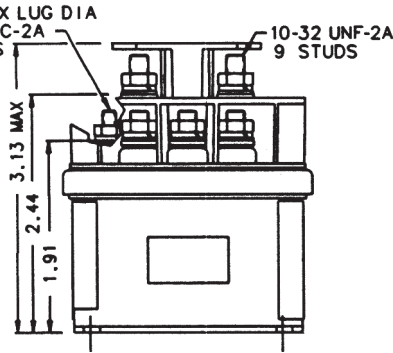
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

**D7, DH7, DHR7, DR7 Series, Rated up to 50 Amps,  
115/200 VAC, 400 Hz (Continued)**

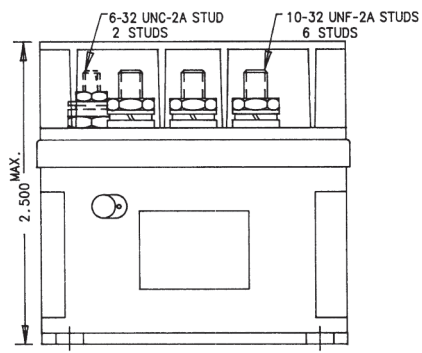
TERMINAL SHIELD CUTOUT  
.270 MAX. 7 PLACES.



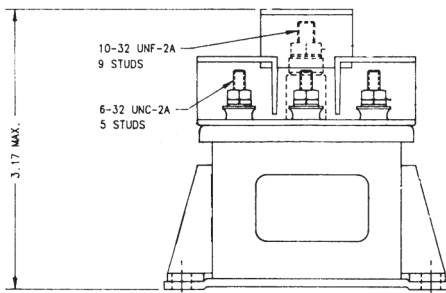
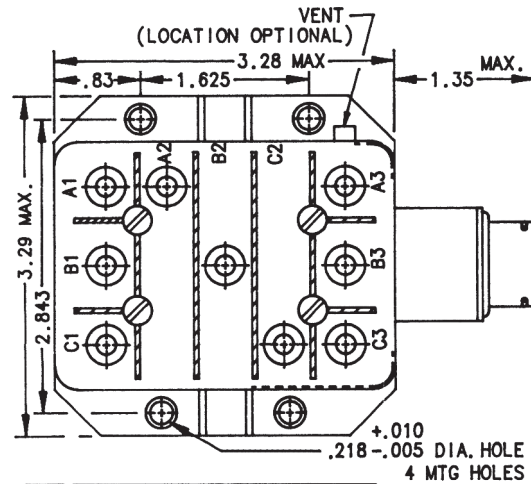
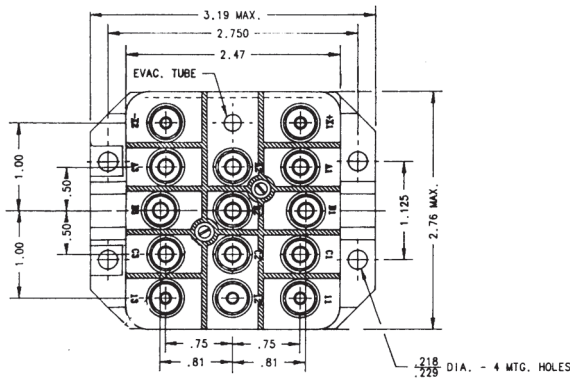
.437 MAX LUG DIA  
6-32 UNC-2A  
2 STUDS



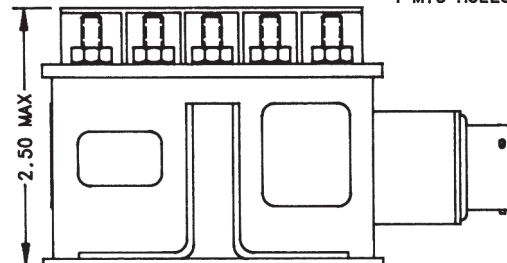
Mounting Style A



Mounting Style B



Mounting Style C



Mounting Style D

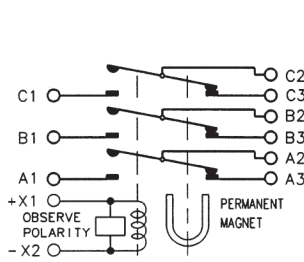
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.



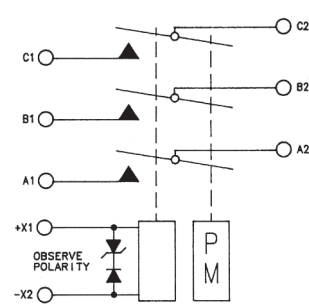


**D7, DH7, DHR7, DR7 Series, Rated up to 50 Amps,  
115/200 VAC, 400 Hz (Continued)**

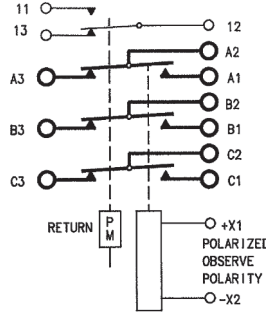
**Circuit Configurations** (Consult factory for other available circuit configurations)



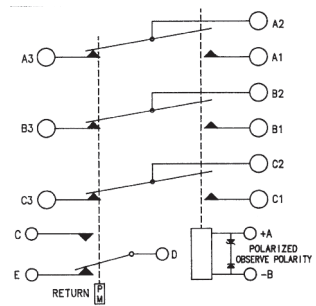
**Circuit Configuration 1**



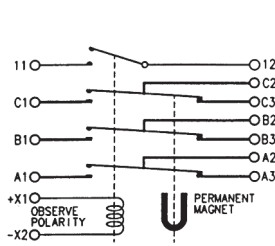
**Circuit Configuration 2**



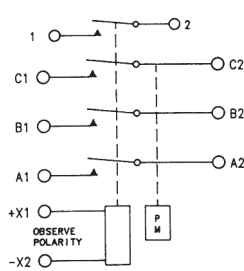
**Circuit Configuration 3**



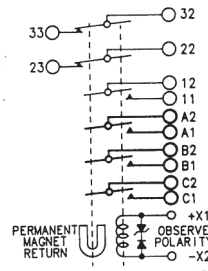
**Circuit Configuration 4**



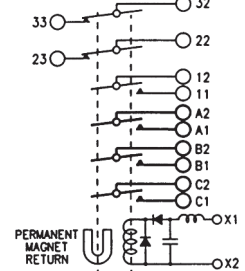
**Circuit Configuration 5**



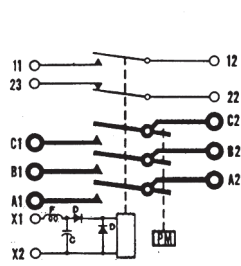
**Circuit Configuration 6**



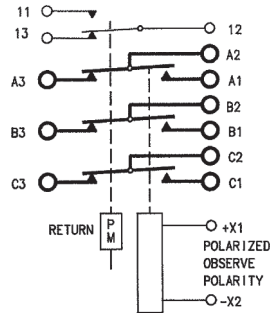
**Circuit Configuration 7**



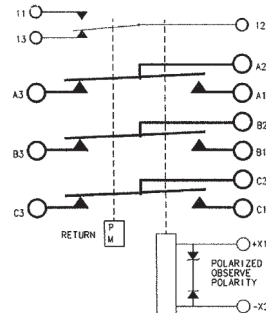
**Circuit Configuration 8**



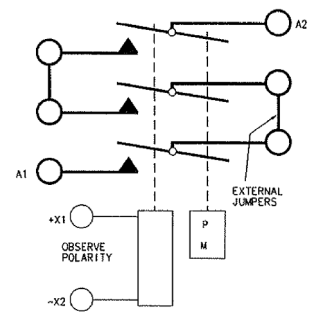
**Circuit Configuration 9**



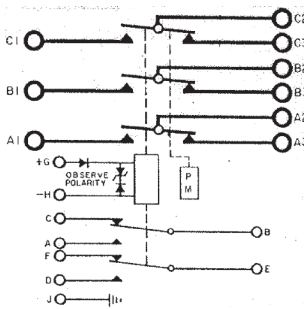
**Circuit Configuration 10**



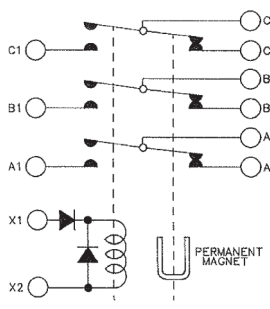
**Circuit Configuration 11**



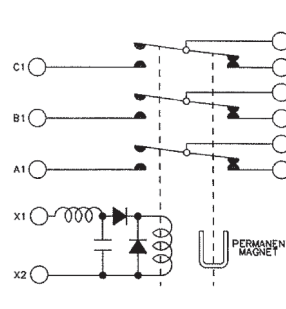
**Circuit Configuration 12**



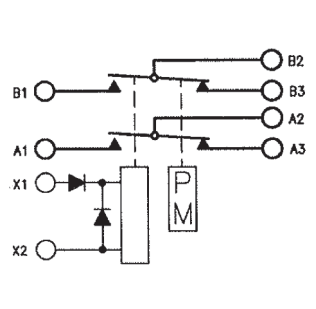
**Circuit Configuration 13**



**Circuit Configuration 14**



**Circuit Configuration 15**

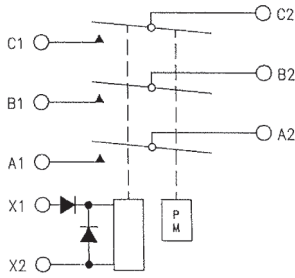


**Circuit Configuration 16**

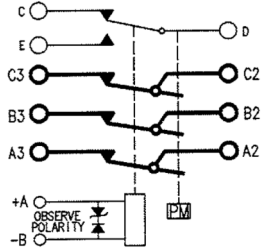
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.



**D7, DH7, DHR7, DR7 Series, Rated up to 50 Amps,  
115/200 VAC, 400 Hz (Continued)**



**Circuit Configuration 17**



**Circuit Configuration 18**

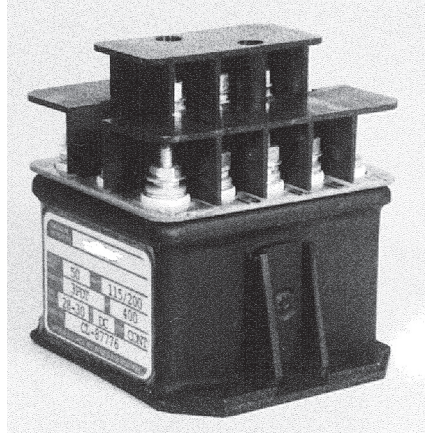
HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
D-7BS	Gasket/Vented	A	C	1	1616036-1
D-7M	Gasket/Vented	B	C	2	1616016-2
D-7GR-2	Gasket/Vented	C	B	3	1616036-3
D-7GRZ	Gasket/Vented	D	C	4	1616036-5
DH-7BB	Hermetically Sealed	A	B	5	1616037-7
DH-7N	Hermetically Sealed	B	B	6	1616017-9
DH-7ZG-1	Hermetically Sealed	C	C	7	1-1616017-1
DHR-7ZG	Hermetically Sealed	C	A	8	1-1616017-2
DR-7VC	Hermetically Sealed	B	A	9	1616018-1
D-7GR	Gasket/Vented	E	B	10	1616036-2
D-7GR-3	Gasket/Vented	F	B	11	1616036-4
D-7MA	Gasket/Vented	G	B	12	1616016-3
D-7MM	Gasket/Vented	H	C	18	1616016-4
DH-7GR	Hermetically Sealed	E	C	11	1616037-9
DH-7ZAB	Hermetically Sealed	H	D	13	1-1616037-1
DHR-7B	Hermetically Sealed	I	E	14	1-1616037-6
DHR-7BE	Hermetically Sealed	J	A	15	1-1616037-7
DHR-7K	Hermetically Sealed	K	E	16	1616522-2
DHR-7M	Hermetically Sealed	L	E	17	1616518-2

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

**D18, DH18 and DHR18 Series, Rated up to 50 Amps,  
115/200 VAC, 400 Hz**

**Product Facts**

- 3PDT, Center off
- Gasket sealed or Hermetically sealed
- Meets many requirements of MIL-PRF-6106



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

**Performance Data**

**Electrical Characteristics**

**Contact Arrangement** — 3PDT, Center Off

**Rated Operating Voltage** — 115/200 VAC, 400 Hz

**Resistive Rating** — 50 Amps

**Inductive Rating** — 50 Amps

**Motor Rating** — 30 Amps

**Lamp Rating** — 15 Amps

**Rupture Rating** — 400 Amps

**General Characteristics**

**Temperature Range** — -55°C to +71°C

**Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles

**Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles

**Dielectric Strength** — All Circuits to Ground — 1,500 Vrms  
Circuit to Circuit — 1,500 Vrms  
Coil to Ground and Aux. Contacts — 1,000 Vrms

**Insulation Resistance, Initial** — 100 megohm min.

**Altitude** — D-18 — 50,000 ft.  
DH-18, DHR-18 — 80,000 ft.

**Weight, Max.** — .94 to 1.50 lbs

**Sinusoidal Vibration** — 10 G @ 70 to 2,000 Hz

**Shock, Max.** — 25 G

**Operate Time @ Nom. Voltage, Max.** — 35 msec

**Release Time @ Nom. Voltage, Max.** — 15 msec

**Bounce Time @ Nom. Voltage, Max.** — 5 msec

**Coil Characteristics**

**Duty Cycle** —

AC Continuous (Type E, See diagram below)

DC Continuous (Type A-D, See diagram below)

**Operating Voltage, Nom.** — 28 Vdc

**Pickup Voltage @ 25°C, Max.** —

Coil Type A — 18 Vdc

Coil Type B — 15 Vdc

**Dropout Voltage @ 25°C, Max.** —

Coil Type A — 1.5 to 7 Vdc

Coil Type B — 2.5 to 6.5 Vdc

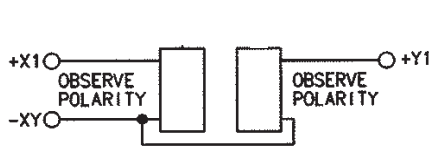
**Coil Resistance ±20% @ 25°C** —

175 Ohms

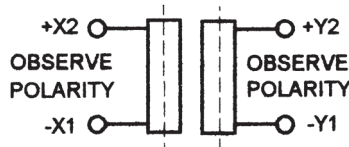
**Coil Current @ 25°C, Max.** —

.175 Amp

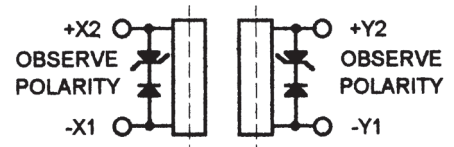
**Coil Type**



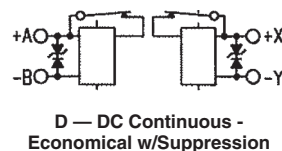
A — DC Continuous



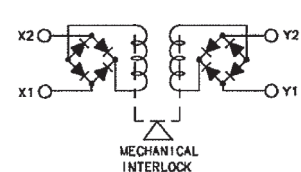
B — DC Continuous



C — DC Continuous with Suppression



D — DC Continuous - Economical w/Suppression



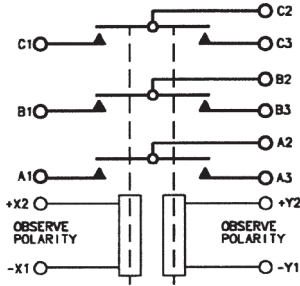
E — AC Continuous

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

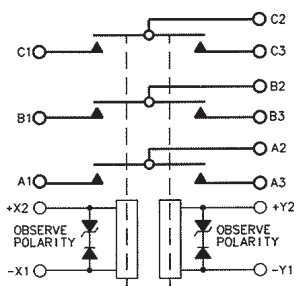


**D18, DH18 and DHR18 Series Contactors, Rated up to 50 Amps, 115/200 VAC, 400 Hz (Continued)**

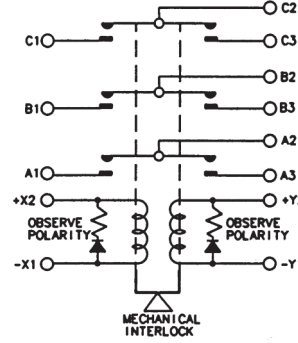
Circuit Configurations (Consult factory for other available circuit configurations)



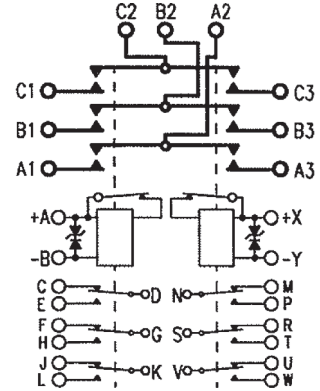
Circuit Configuration 1



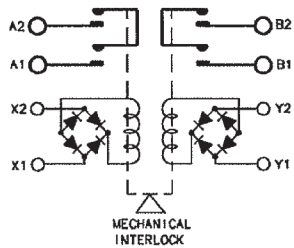
Circuit Configuration 2



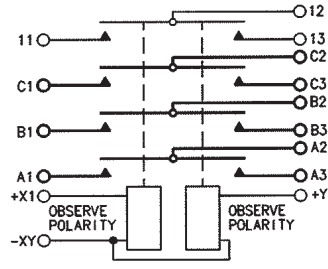
Circuit Configuration 3



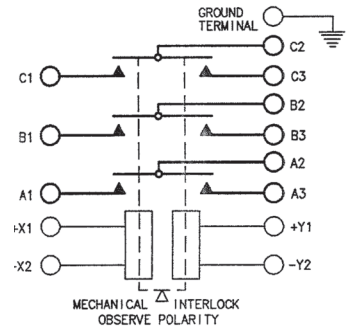
Circuit Configuration 4



Circuit Configuration 5



Circuit Configuration 6



Circuit Configuration 7

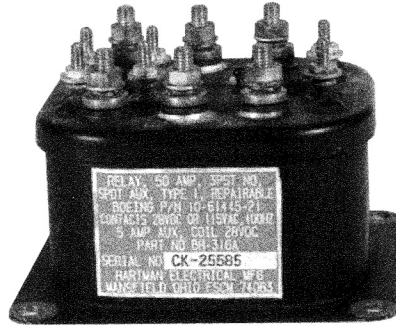
HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
D-18	Gasket/Vented	A	A	1	1616048-1
D-180A	Gasket/Vented	D	C	6	1616048-2
D-18AA	Gasket/Vented	A	B	2	1616048-3
D-18F	Gasket/Vented	A	B	3	1616048-4
D-18ZZC	Gasket/Vented	B	D	4	1-1616957-3
DH-18	Hermetically Sealed	A	A	1	1616050-1
DH-18Y	Hermetically Sealed	A	A	7	1616524-3
DR-18E-5	Gasket/Vented	C	E	5	1616099-1

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

**BH-316 Series, Rated up to 50 Amps, 115/200 VAC, 400 Hz or 28 Vdc**

**Product Facts**

- 3PST NO, Double break
- Hermetically sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



**Performance Data**

**Electrical Characteristics**

**Contact Arrangement** — 3PST NO, Double Break

**Rated Operating Voltage** — 28 Vdc or 115/200 VAC, 400 Hz, 3 phase

**Resistive Rating** — 50 Amps

**Inductive Rating** — 115/200 VAC, 400 Hz, 3 phase — 50 Amps  
At 28 Vdc — 25 Amps

**Motor Rating** — 50 Amps

**General Characteristics**

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

**Operating Cycles (Life) at Rated Resistive Load, Min.** — 100,000 cycles

**Operating Cycles (Life) Mechanical, Min.** — 200,000 cycles

**Dielectric Strength** — All Circuits to Ground — 1,500 Vrms  
Circuit to Circuit — 1,500 Vrms  
Coil to Ground and Aux. Contacts — 1,000 Vrms

**Insulation Resistance, Initial** — 100 megohm min.

**Weight, Max.** — 1.20 lbs

**Impact Shock** — 5 G

**Close Time @ 28 Vdc and 25°C, Max.** — 25 msec

**Release Time @ 28 Vdc and 25°C, Max.** — 10 msec

**Coil Characteristics**

**Duty Cycle** — Continuous

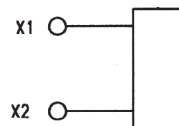
**Operating Voltage, Nom.** — 28 Vdc

**Pickup Voltage, Max.** — 18 Vdc

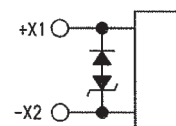
**Dropout Voltage** — 1.5 to 7 Vdc

**Coil Current, Holding, Max.** — 0.5 Amp

**Coil Type**



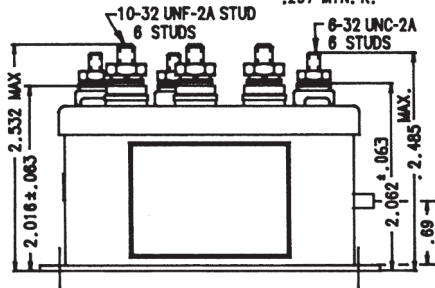
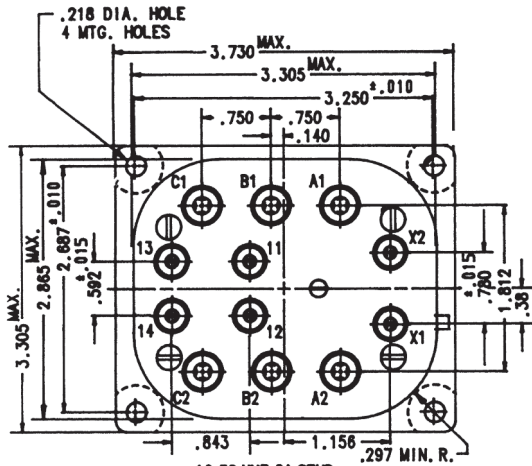
A — Continuous



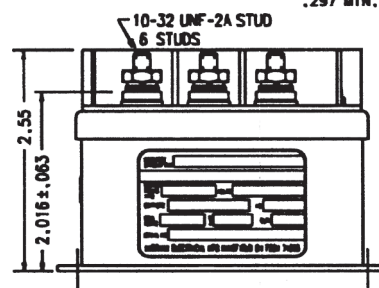
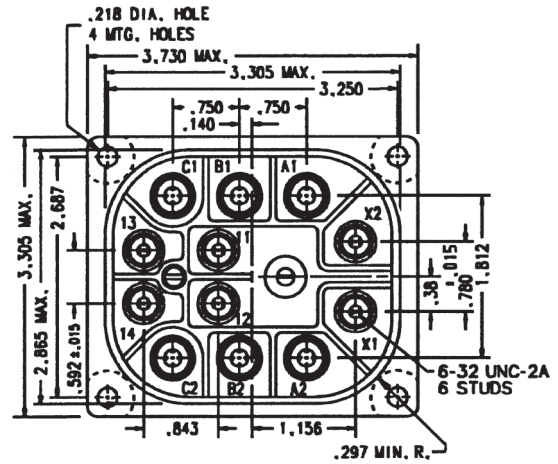
B — Continuous w/Suppression

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

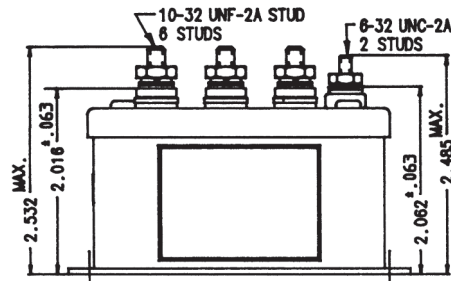
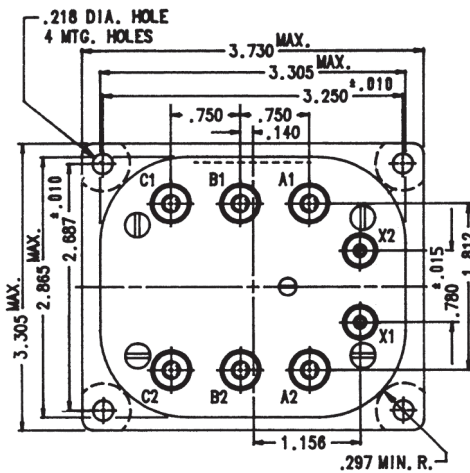
**BH-316 Series, Rated up to 50 Amps, 115/200 VAC, 400 Hz or 28 Vdc (Continued)**



Mounting Style A



Mounting Style B

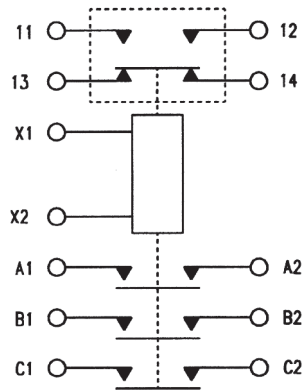


Mounting Style C

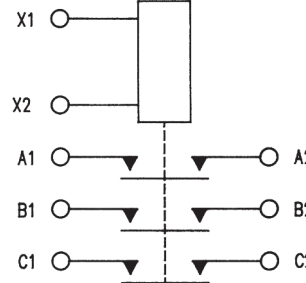
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

**BH-316 Series, Rated up to 50 Amps, 115/200 VAC, 400 Hz or 28 Vdc (Continued)**

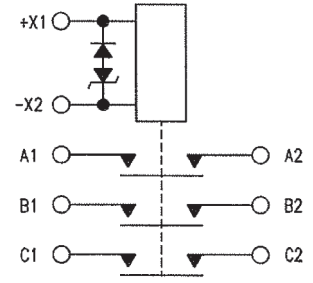
**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 2



Circuit Configuration 3

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
BH-316	Hermetically Sealed	A	Continuous	2	1616008-4
BH-316A	Hermetically Sealed	A	Continuous	1	1616008-5
BH-316D	Hermetically Sealed	A	Continuous	1	1616008-6
BH-316C	Hermetically Sealed	B	Continuous	3	1-1616520-0

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

**B-138 Series, Rated up to 60 Amps, 115/200 VAC, 400 Hz**

**Product Facts**

- TPST NO and TPDT NC
- Gasket sealed or Hermetically sealed
- 115/200 VAC, 400 Hz, 3 phase
- Auxiliary contacts available
- Meets the requirements of MIL-PRF-6106



**Performance Data**

**Electrical Characteristics**

- Contact Arrangement** — TPST NO and TPDT NC
- Rated Operating Voltage** — 115/200 VAC, 400 Hz, 3 phase
- Current, Resistive** — 60 Amps
- Current, Inductive** — 60 Amps
- Current, Motor** — 60 Amps
- Current, Rupture** — 600 Amps

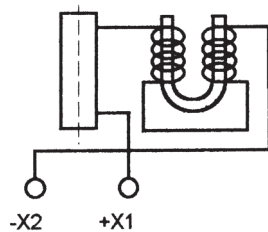
**General Characteristics**

- Temperature Range** — -55°C to +71°C
- Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles
- Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles
- Dielectric Strength** — All Circuits to Ground — 1,500 Vrms  
Circuit to Circuit — 1,500 Vrms  
Coil to Ground and Aux. Contacts — 1,000 Vrms
- Altitude Max.** — 50,000 ft.
- Weight, Nominal** — 1.50 to 2.0 lbs

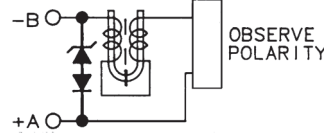
**Coil Characteristics**

- Duty Cycle** — Continuous or continuous with suppression
- Operating Voltage, Nom.** — 28 Vdc
- Pickup Voltage, Max. @ 85°C** — 18 Vdc
- Dropout Voltage, Max.** — 1.5 to 7 Vdc
- Coil Current @ 29 Vdc Max. @ 25°C** — 0.5 Amps
- Inrush** — 5 Amps

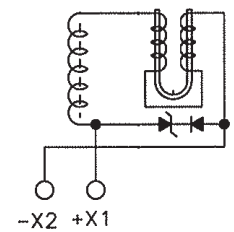
**Coil Type**



**A — Continuous**



**B — Continuous with Suppression**

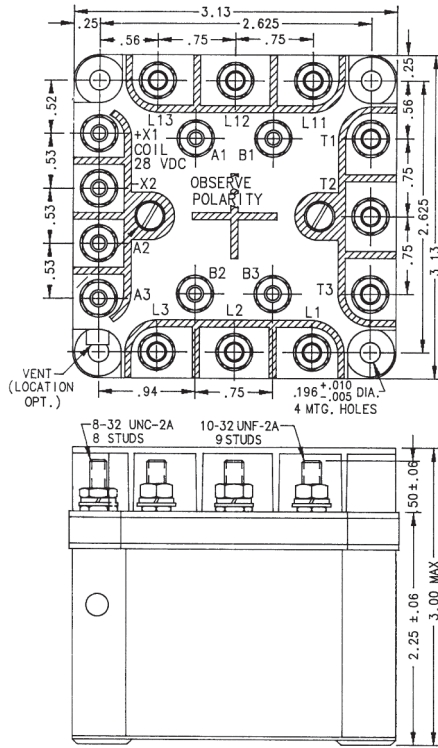


**C — Continuous with Suppression**

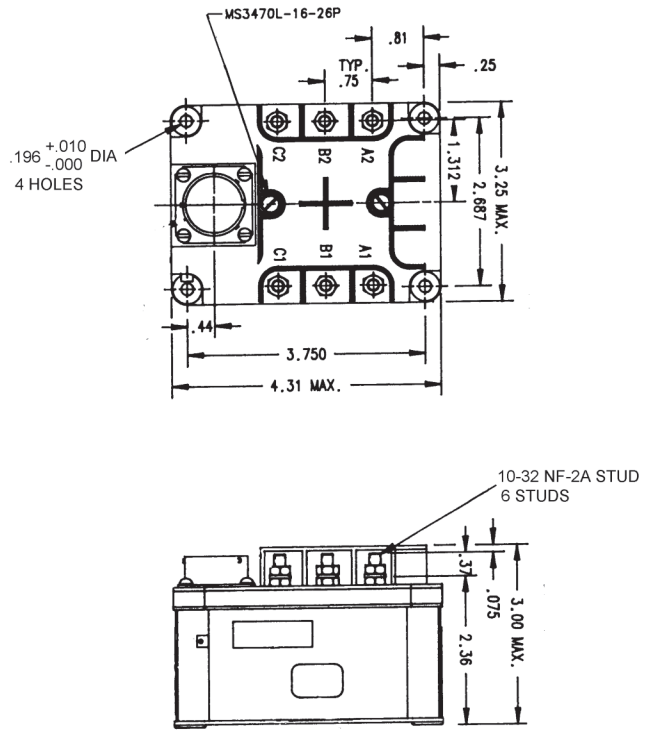
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.



**B-138 Series, Rated up to 60 Amps, 115/200 VAC, 400 Hz (Continued)**

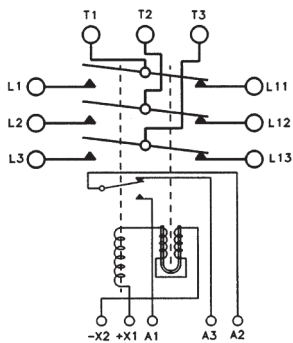


Mounting Style A

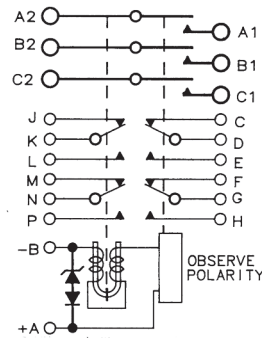


Mounting Style B

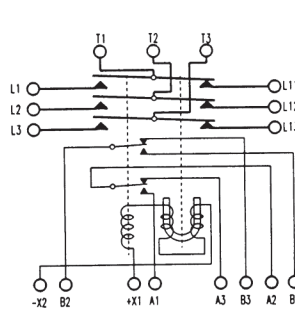
**Circuit Configurations (Consult factory for other available circuit configurations)**



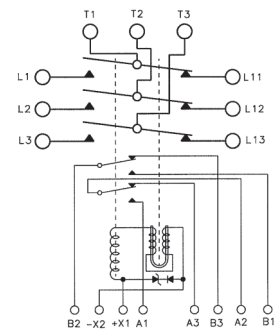
Circuit Configuration 1



Circuit Configuration 2



Circuit Configuration 3



Circuit Configuration 4

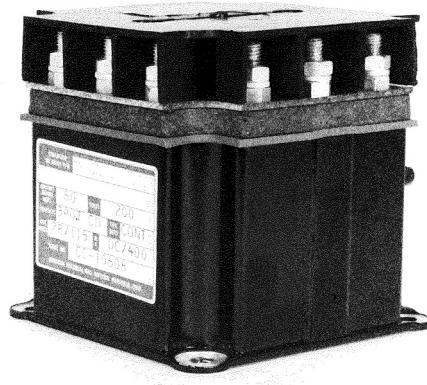
HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
B-138S	Gasket/Vented	B	B	2	1616002-5
B-138XEH	Gasket/Vented	A	C	4	1616028-3
B-138BH	Gasket/Vented	A	A	1	1616028-1
B-138XAH	Gasket/Vented	A	A	3	1616028-2

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

**B-140 Series, Rated up to 60 Amps, 115/200 VAC, 400 Hz**

**Product Facts**

- 3PDT NO, Center off
- Gasket sealed or Hermetically sealed
- 115/200 VAC, 400 Hz, 3 phase
- Auxiliary contacts available
- Meets the requirements of MIL-PRF-6106



**Performance Data**

**Electrical Characteristics**

- Contact Arrangement** — 3PDT NO, Center Off
- Rated Operating Voltage** — 115/200 VAC, 400 Hz, 3 phase
- Current, Resistive** — 60 Amps
- Current, Inductive** — 60 Amps
- Current, Motor** — 60 Amps
- Current, Rupture** — 600 Amps

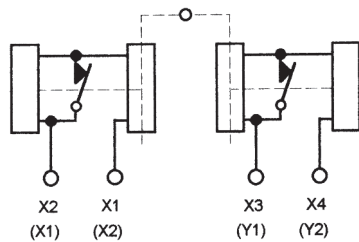
**General Characteristics**

- Temperature Range** — -55°C to +120°C
- Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles
- Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles
- Dielectric Strength** — All Circuits to Ground — 1,500 Vrms  
Circuit to Circuit — 1,500 Vrms  
Coil to Ground and Aux. Contacts — 1,000 Vrms
- Insulation Resistance, Initial** — 100 megohm min.
- Altitude Max.** — 50,000 ft.
- Weight, Nominal** — 1.50 to 2.31 lbs
- Sinusoidal Vibration** — 10 G @ 70 to 2,000 Hz
- Shock, Max.** — 15 G

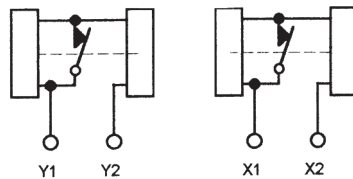
**Coil Characteristics**

- Duty Cycle** — Continuous (Type A or B, See diagram below)
- Operating Voltage, Nom.** — 28 Vdc
- Pickup Voltage, Max. @ 85°C** — 18 Vdc
- Dropout Voltage, Max.** — 1.5 to 7 Vdc
- Coil Current @ 29 Vdc Max. @ 25°C** — 0.35 Amps
- Inrush** — 5 Amps

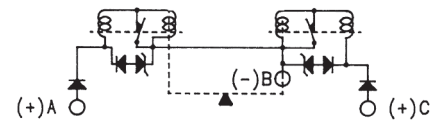
**Coil Type**



**A — Continuous**



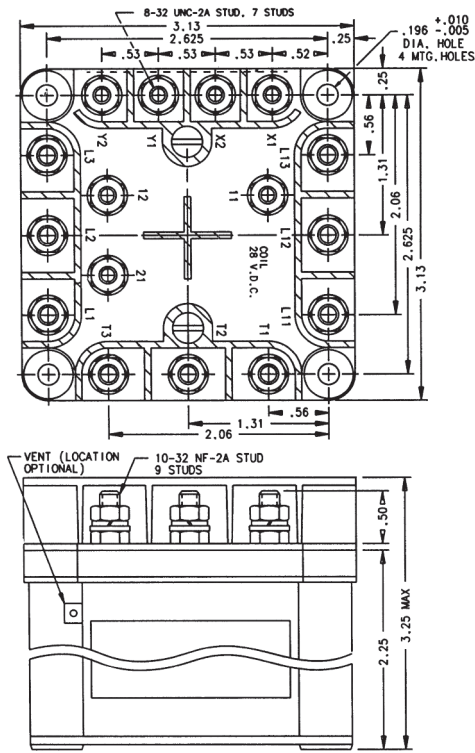
**B — Continuous**



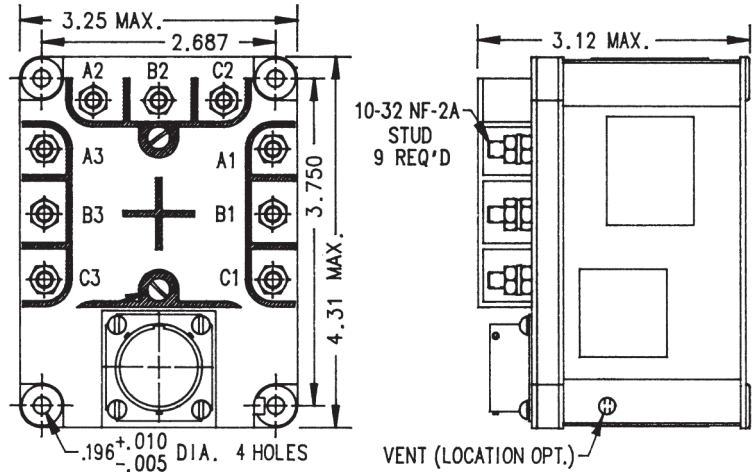
**C — Continuous w/Suppression**

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

**B-140 Series, Rated up to 60 Amps, 115/200 VAC, 400 Hz (Continued)**

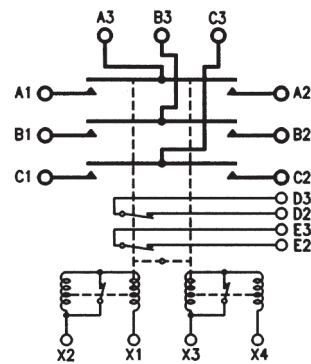


Mounting Style A

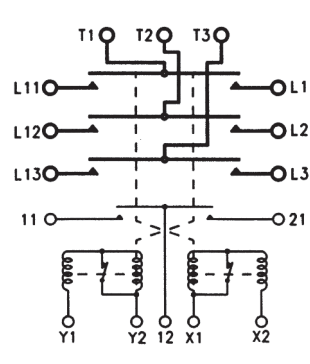


Mounting Style B

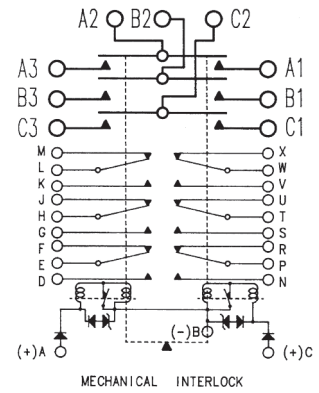
**Circuit Configurations (Consult factory for other available circuit configurations)**



Circuit Configuration 1



Circuit Configuration 2



Circuit Configuration 3

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
B-140AP-1	Gasket/Vented	B	Continuous	3	1616043-7
B-140BH	Gasket/Vented	A	Continuous	1	1616043-9
B-140V	Gasket/Vented	A	Continuous	2	1-1616043-0

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

**DH-7 Series, Rated up to 60 Amps, 115/200 VAC, 400 Hz**

**Product Facts**

- 3PDT
- Hermetically sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



**Performance Data**

**Electrical Characteristics**

**Contact Arrangement** — 3PDT

**Rated Operating Voltage** — 115/200 VAC, 400 Hz, 3 phase

**Resistive Rating** — 60 Amps

**General Characteristics**

**Temperature Range** — -55°C to +71°C

**Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles

**Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles

**Dielectric Strength** — All Circuits to Ground — 1,500 Vrms  
Circuit to Circuit — 1,500 Vrms  
Coil to Ground and Aux. Contacts — 1,000 Vrms

**Altitude** — 80,000 ft

**Weight, Max.** — .91 lbs

**Coil Characteristics**

**Duty Cycle** — Continuous

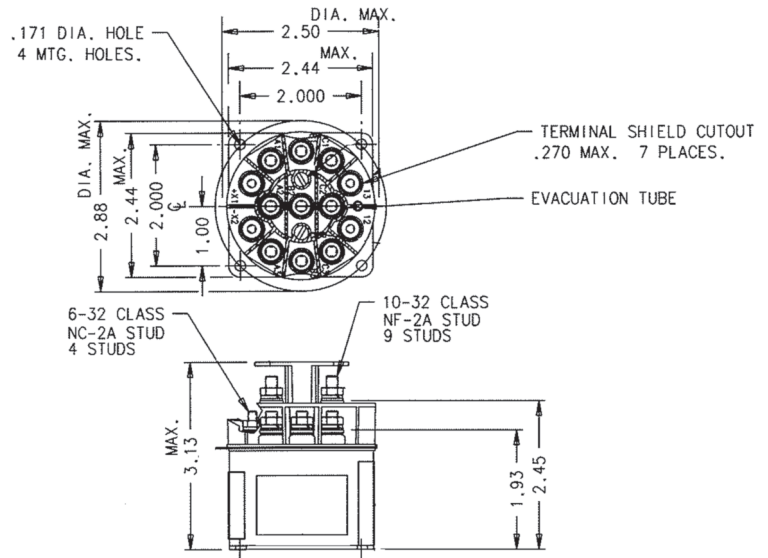
**Operating Voltage, Nom.** — 28 Vdc

**Pickup Voltage @ 25°C, Max.** — 18 Vdc

**Dropout Voltage @ 25°C, Max.** — 1.5 to 7 Vdc

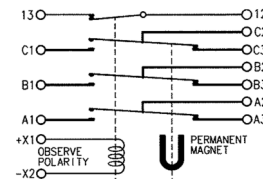
**Coil Resistance ±20% @ 25°C** — 126 Ohms

**Coil Current @ 25°C, Max.** — .28 Amp



**Mounting Style A**

**Circuit Configurations** (Consult factory for other available circuit configurations)



**Circuit Configuration 1**

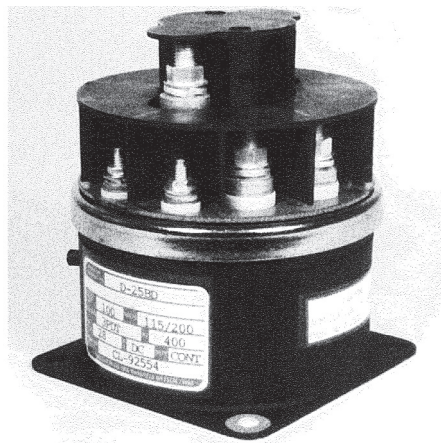
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
DH-7BC	Hermetically Sealed	A	Continuous	1	1616037-8

**D25, DH25 and DHR25 Series, Rated up to 100 Amps,  
115/200 VAC, 400 Hz**

**Product Facts**

- 3PDT NO
- Gasket sealed or Hermetically sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



**Performance Data**

**Electrical Characteristics**

- Contact Arrangement** — 3PDT NO
- Rated Operating Voltage** — 115/200 VAC, 400 Hz, 3 phase
- Resistive Rating** — 100 Amps
- Inductive Rating** — 100 Amps

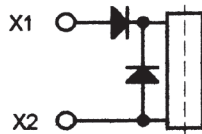
**General Characteristics**

- Temperature Range** — -55°C to +85°C
- Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles
- Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles
- Dielectric Strength** — All Circuits to Ground — 1,500 Vrms  
Circuit to Circuit — 1,500 Vrms  
Coil to Ground and Aux. Contacts — 1,000 Vrms
- Insulation Resistance, Initial** — 100 megohm min.
- Altitude** — D-25 — 50,000 ft.  
DH-25, DHR-25 — 80,000 ft.
- Weight, Max.** — 2.20 to 2.75 lbs
- Sinusoidal Vibration** — 10 G @ 70 to 2,000 Hz
- Shock, Max.** — 25 G
- Operate Time @ Nom. Voltage, Max.** — 35 msec
- Release Time @ Nom. Voltage, Max.** — 35 msec
- Bounce Time @ Nom. Voltage, Max.** — 5 msec

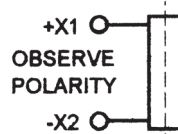
**Coil Characteristics**

- Duty Cycle** — VAC 400 Hz — AC (Type A, See diagram below)  
Vdc — Continuous (Type B, See diagram below)  
Vdc — Continuous with suppression (Type C, See diagram below)
- Operating Voltage, Nom.** — VAC 400 Hz — 115 VAC  
Vdc — 28 Vdc
- Pickup Voltage @ 25°C, Max.** — VAC 400 Hz — 103.5 VAC  
Vdc — 18 Vdc
- Dropout Voltage @ 25°C, Max.** — VAC 400 Hz — 5 to 45 VAC  
Vdc — 1.5 to 7 Vdc
- Coil Resistance ±20% @ 25°C** — VAC 400 Hz — N/A  
Vdc — 175 Ohms

**Coil Type**



A — AC



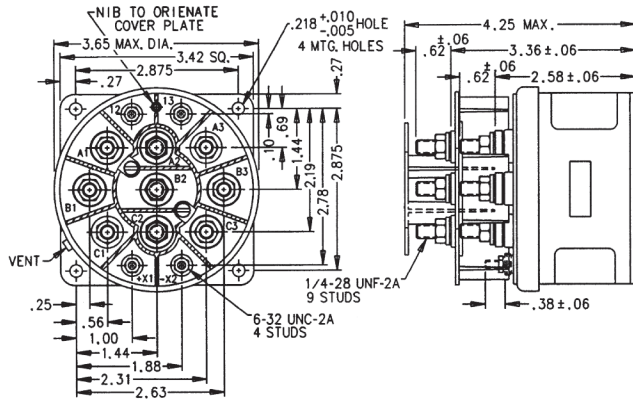
B — Continuous



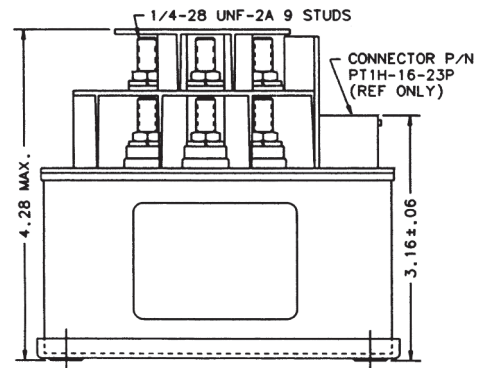
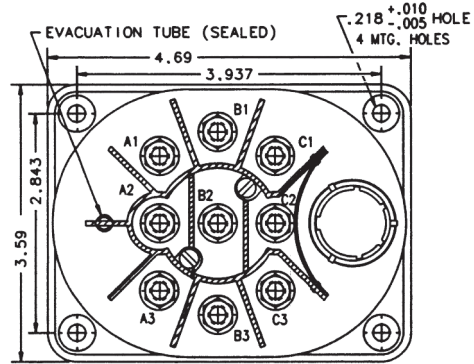
C — Continuous with Suppression

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

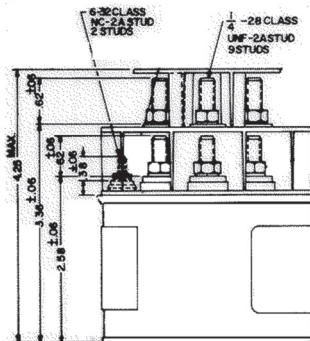
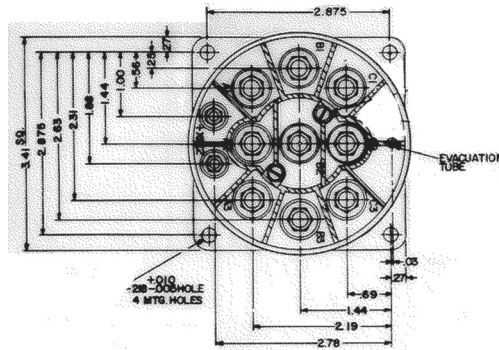
**D25, DH25 and DHR25 Series, Rated up to 100 Amps,  
115/200 VAC, 400 Hz (Continued)**



Mounting Style A



Mounting Style B

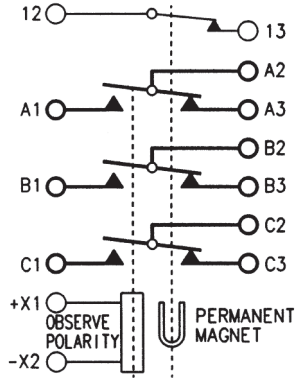


Mounting Style C

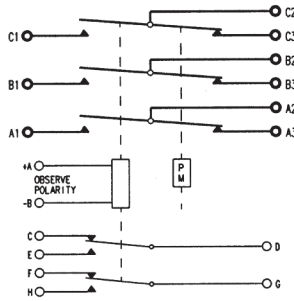
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

**D25, DH25 and DHR25 Series, Rated up to 100 Amps,  
115/200 VAC, 400 Hz (Continued)**

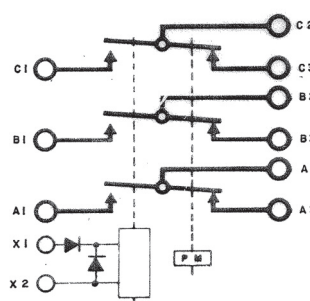
**Circuit Configurations** (Consult factory for other available circuit configurations)



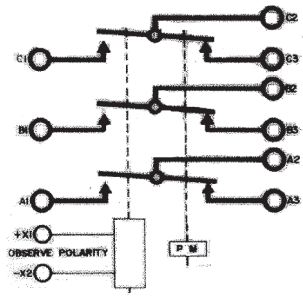
Circuit Configuration 1



Circuit Configuration 2



Circuit Configuration 3



Circuit Configuration 4

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
D-25BD	Gasket/Vented	A	B	1	1616034-3
DH-25B	Hermetically Sealed	C	B	4	1616037-2
DH-25BA	Hermetically Sealed	B	B	2	1616037-3
DHR-25BG	Hermetically Sealed	A	A	3	1-1616037-5

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

**D25 and DH25 Series, Rated up to 120 Amps,  
115/200 VAC, 400 Hz**

**Product Facts**

- 3PST NO
- Gasket sealed or Hermetically sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



**Performance Data**

**Electrical Characteristics**

- Contact Arrangement** — 3PST NO
- Rated Operating Voltage** — 115/200 VAC, 400 Hz, 3 phase
- Resistive Rating** — 120 Amps
- Inductive Rating** — 120 Amps
- Motor Rating** — 100 Amps
- Rupture Rating** — 1,000 Amps

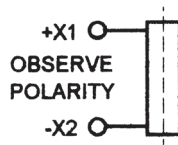
**General Characteristics**

- Temperature Range** — -55°C to +85°C
- Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles
- Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles
- Dielectric Strength** — All Circuits to Ground — 1,500 Vrms  
Circuit to Circuit — 1,500 Vrms  
Coil to Ground and Aux. Contacts — 1,000 Vrms
- Altitude** — D-25 — 50,000 ft.  
DH-25 — 80,000 ft.
- Weight, Max.** — 2.10 lbs

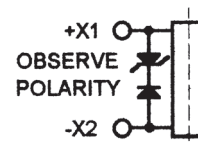
**Coil Characteristics**

- Duty Cycle** — Vdc — Continuous (Type A, See diagram below)  
Vdc — Continuous with suppression (Type B, See diagram below)
- Operating Voltage, Nom.** — 28 Vdc
- Pickup Voltage @ 25°C, Max.** — 18 Vdc
- Dropout Voltage @ 25°C, Max.** — 1.5 to 7 Vdc
- Coil Resistance ±20% @ 25°C** — 113 Ohms

**Coil Type**



**A — Continuous**

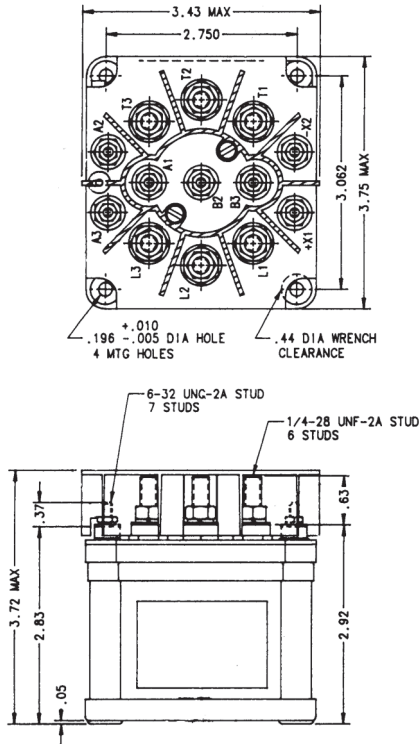


**B — Continuous with Suppression**

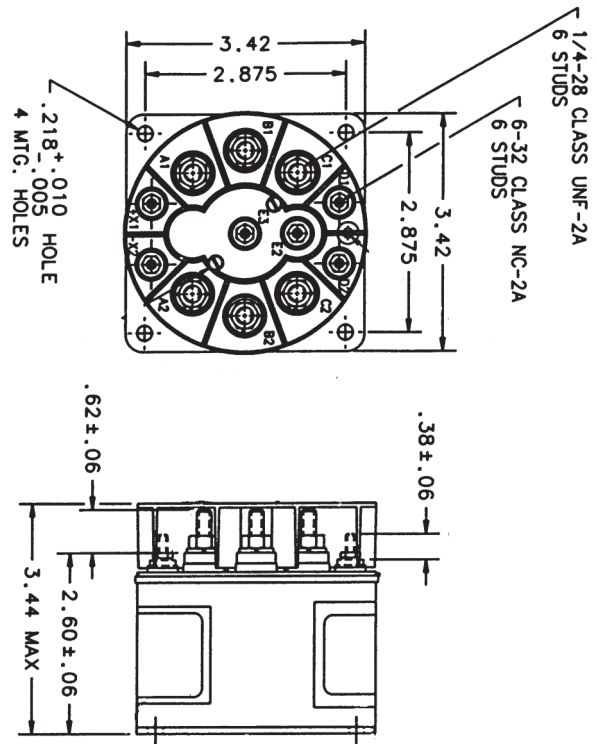
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.



**D25 and DH25 Series, Rated up to 120 Amps,  
115/200 VAC, 400 Hz (Continued)**

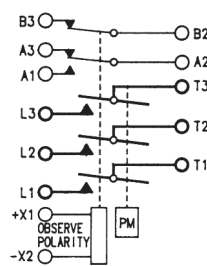


Mounting Style A

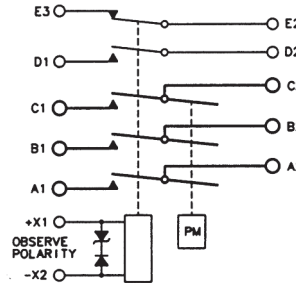


Mounting Style B

**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 2

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
D-25CF	Gasket/Vented	A	A	1	1616015-1
DH-25CU	Hermetically Sealed	B	B	2	1616017-4

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

**D-31 Series, Rated up to 100 Amps, 115/200 VAC, 400 Hz**

**Product Facts**

- 3PDT, Center off
- Hermetically sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



**Performance Data**

**Electrical Characteristics**

**Contact Arrangement** — 3PDT, Center Off

**Rated Operating Voltage** — 115/200 VAC, 400 Hz, 3 phase

**Resistive Rating** — 100 Amps

**General Characteristics**

**Temperature Range** — -55°C to +71°C

**Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles

**Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles

**Dielectric Strength** — All Circuits to Ground — 1,500 Vrms  
Circuit to Circuit — 1,500 Vrms  
Coil to Ground and Aux. Contacts — 1,000 Vrms

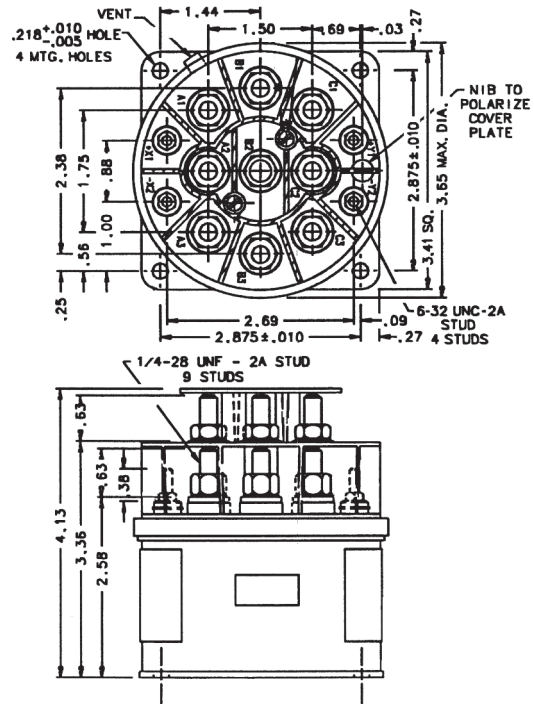
**Altitude** — 50,000 ft  
**Weight, Max.** — 2.31 lbs

**Coil Characteristics**

**Duty Cycle** — Continuous  
**Operating Voltage, Nom.** — 28 Vdc  
**Pickup Voltage @ 71°C, Max.** — 18 Vdc

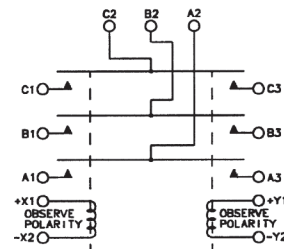
**Dropout Voltage, Max.** — 1.5 to 7 Vdc

**Coil Resistance ±20% @ 25°C** — 160 Ohms



Mounting Style A

**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
D-31C	Gasket/Vented	A	Continuous	1	1616049-1

**D-31, DH-31, and DHL-31 Series, Rated up to 120 Amps,  
115/200 VAC, 400 Hz**

**Product Facts**

- 3PDT, Center off
- Gasket sealed or Hermetically sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



**Performance Data**

**Electrical Characteristics**

- Contact Arrangement** — 3PDT, Center Off
- Rated Operating Voltage** — 115/200 VAC, 400 Hz, 3 phase
- Resistive Rating** — 120 Amps
- Inductive Rating** — 120 Amps
- Motor Rating** — 80 Amps
- Rupture Rating** — 1,000 Amps

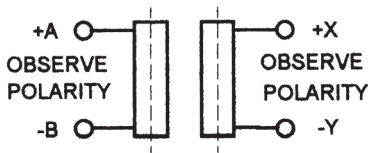
**General Characteristics**

- Temperature Range** — -55°C to +71°C
- Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles
- Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles
- Dielectric Strength** — All Circuits to Ground — 1,500 Vrms  
Circuit to Circuit — 1,500 Vrms  
Coil to Ground and Aux. Contacts — 1,000 Vrms
- Altitude** — D-31 — 50,000 ft  
DH-31, DHL-31 — 70,000 ft
- Weight** — 2.60 lbs

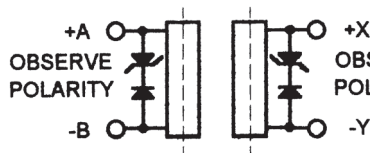
**Coil Characteristics**

- Duty Cycle** — Continuous (Type A, See diagram below)  
Continuous with suppression (Type B or Type C, See diagram below)
- Operating Voltage, Nom.** — 28 Vdc
- Pickup Voltage @ 25°C, Max.** — Coil Type A and C — 18 Vdc  
Coil Type B — 15 Vdc
- Dropout Voltage @ 25°C, Max.** — Coil Type A and C — 1.5 to 7 Vdc  
Coil Type B — 2 to 7 Vdc
- Coil Resistance ±20% @ 25°C** — Coil Type A — N/A  
Coil Type B — 100 Ohms  
Coil Type C — 132 Ohms
- Coil Current @ 25°C, Max.** — .350 Amp

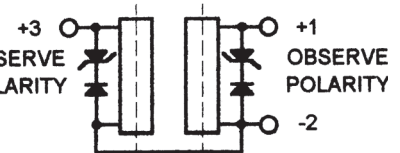
**Coil Type**



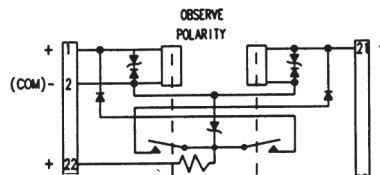
A — Continuous



B — Continuous with Suppression



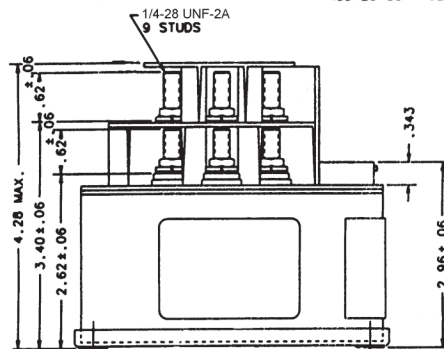
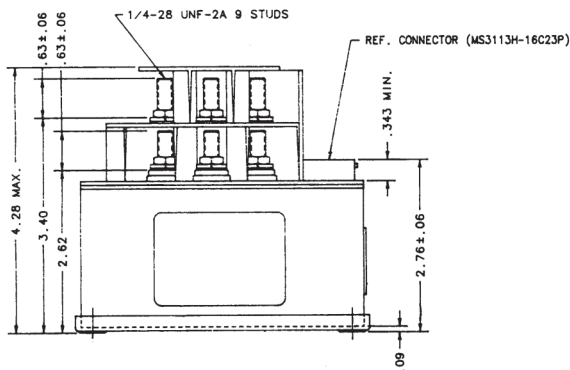
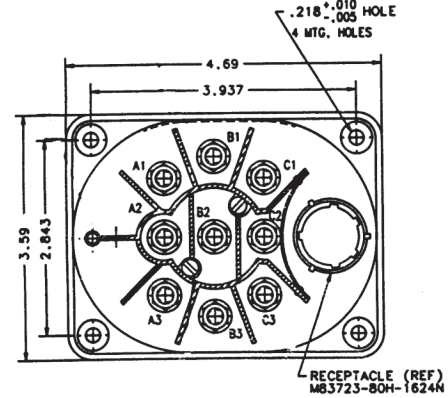
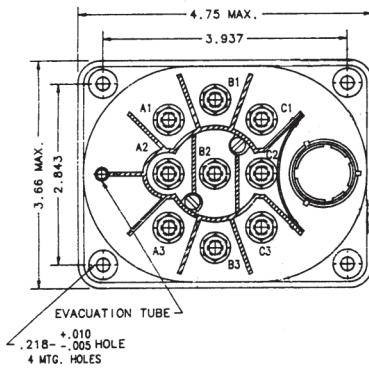
C — Continuous with Suppression



D — Latching

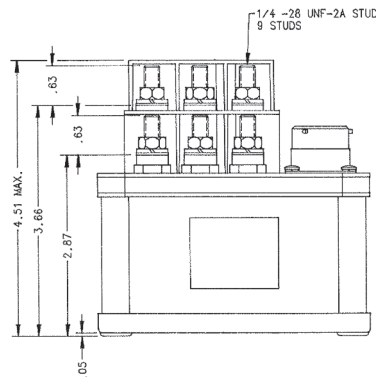
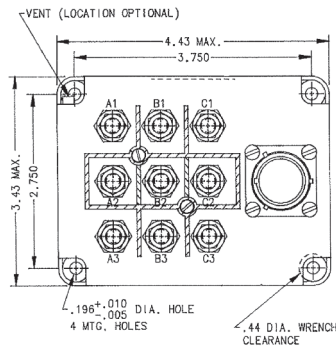
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

**D-31, DH-31, and DHL-31 Series, Rated up to 120 Amps,  
115/200 VAC, 400 Hz (Continued)**



Mounting Style A

Mounting Style B

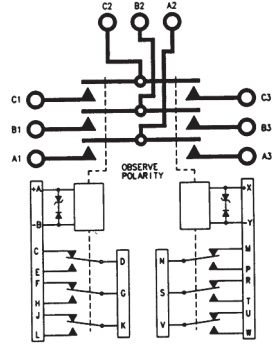


Mounting Style C

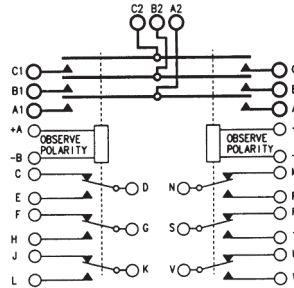
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

**D-31, DH-31, and DHL-31 Series, Rated up to 120 Amps,  
115/200 VAC, 400 Hz (Continued)**

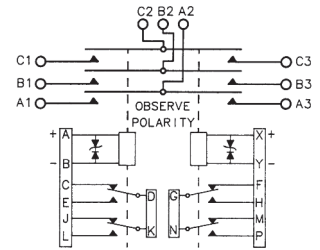
**Circuit Configurations** (Consult factory for other available circuit configurations)



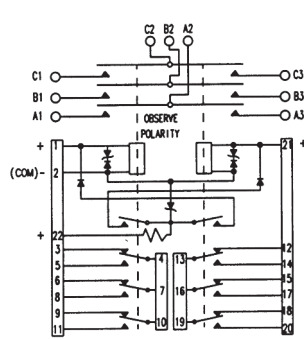
**Circuit Configuration 1**



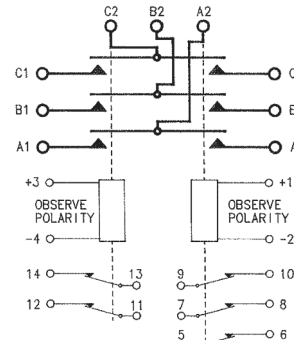
**Circuit Configuration 2**



**Circuit Configuration 3**



**Circuit Configuration 4**



**Circuit Configuration 4**

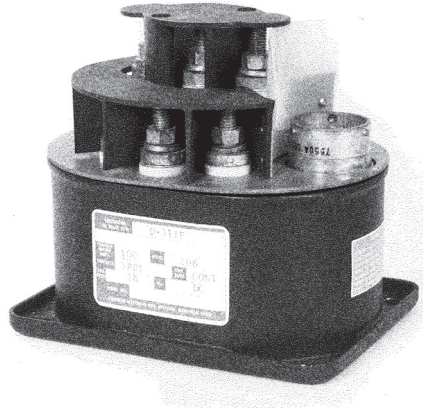
HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
D-31DB	Gasket/Vented	A	B	1	1616049-2
D-31TH	Gasket/Vented	C	A	5	1616524-5
DH-31A	Hermetically Sealed	A	A	2	1616050-4
DH-31DA	Hermetically Sealed	A	B	3	1616050-5
DH-31DAA	Hermetically Sealed	A	A	3	1616050-6
DHL-31B	Hermetically Sealed	B	D	4	1616050-8

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

**D-25 Series, Rated up to 125 Amps, 115/200 VAC, 400 Hz**

**Product Facts**

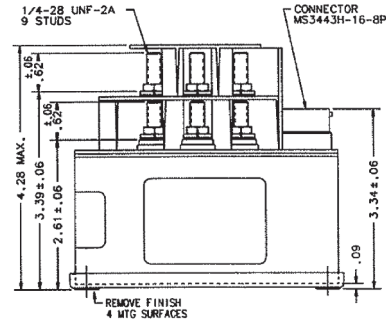
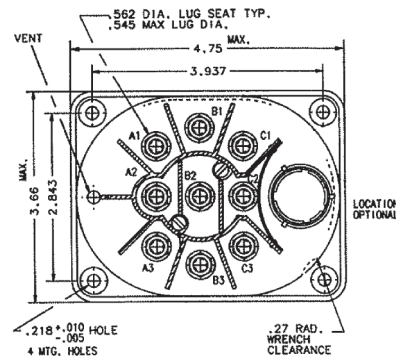
- 3PDT, Side stable
- Gasket sealed



**Performance Data**

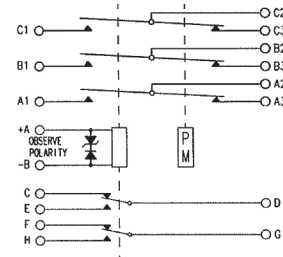
**Electrical Characteristics**

- Main Contacts —**
- Contact Arrangement —** 3PDT, Side Stable
- Rated Operating Voltage —** 115/200 VAC, 400 Hz
- Resistive Rating —** 125 Amps
- Inductive Rating —** 100 Amps
- Motor Load —** 60 Amps
- Rupture Rating —** 600 Amps
- Overload Rating —** 600 Amps
- Auxiliary Contacts —**
- Contact Arrangement —** 2PDT
- Voltage —** 28 Vdc or 115 VAC, 400 Hz
- Resistive Rating —** 3 Amps
- General Characteristics**
- Temperature Range —** -55°F to +71°F
- Altitude, Max. —** 50,000 ft
- Weight, Nominal —** 2.75 lbs
- Coil Characteristics**
- Duty Cycle —** Continuous
- Operating Voltage, Nom. —** 28 Vdc
- Pickup Voltage @ 25°C, Max. —** 18 Vdc
- Dropout Voltage @ 25°C —** 2.5 to 7 Vdc
- Coil Resistance @ 25°C —** 113 Ohms ± 20%



**Mounting Style A**

**Circuit Configurations** (Consult factory for other available circuit configurations)



**Circuit Configuration 1**

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

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
D-25BAH	Gasket/Vented	A	Continuous	1	1616034-2

## B309 Series, Rated up to 130 Amps, 115 VDC

### Product Facts

- 3PST NO, Single break main contacts
- 2PDT Auxiliary contacts (note 1)
- Gasket sealed
- Meets many requirements of MIL-PRF-6106

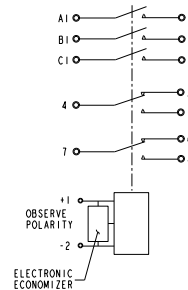
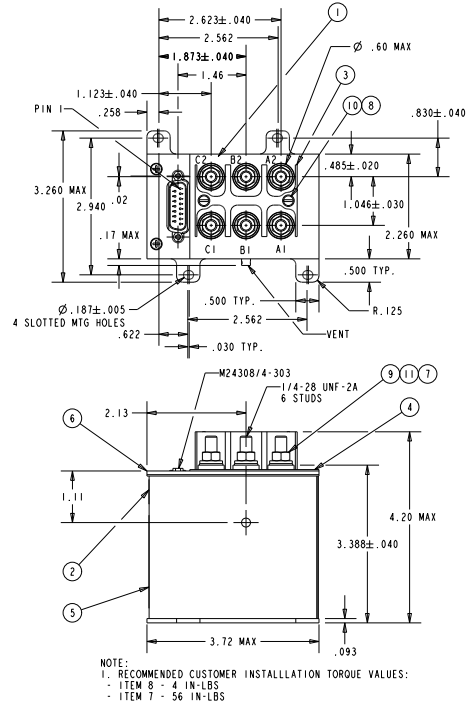
### Performance Data

#### Electrical Characteristics

- Contact Arrangement** — 3PST NO, Single Break
- Rated Operating Voltage** — 115 VDC
- Resistive Current Rating** — 130 Amps (see note 2)
- Rupture Rating** — 1300 Amps (see note 3)

#### General Characteristics

- Temperature Range** — -55°C to +85°C
- Minimum Electrical Cycles** — 50,000
- Minimum Mechanical Cycles** — 100,000 @ 32.5 A
- Dielectric Strength** — 1500 Vrms
- Altitude** — 50,000 ft
- Weight, Max.** — 1.35 lbs
- Duty Cycle** — Continuous (Electronically Economized)
- Coil Operating Voltage** — 28 Vdc
- Drop Out Voltage** — 1.5 to 7 Vdc



HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
B309A	Gasket Sealed	A	Continuous, Electronically Economized	1	1-1616975-7

### NOTES

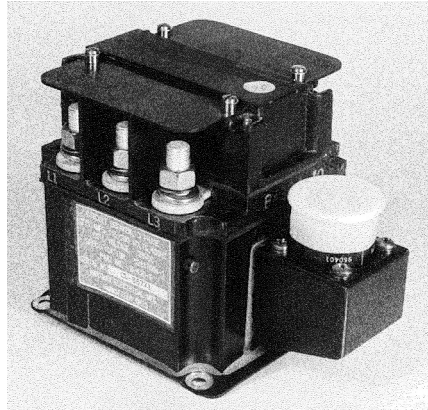
1. Other aux contact configurations available. Consult Factory.
2. Units with current ratings to 175A are available. Consult Factory.
3. Units with rupture ratings to 1750A are available. Consult Factory.

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

**B-451 Series, Rated up to 175 Amps, 115/200 VAC, 400 Hz**

**Product Facts**

- 3PDT, Magnetic latching
- Gasket sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



**Performance Data**

**Electrical Characteristics**

**Contact Arrangement** — 3PDT, Magnetic Latching

**Rated Operating Voltage** — 115/200 VAC, 400 Hz

**Resistive Rating** — 175 Amps

**General Characteristics**

**Temperature Range** — -55°C to +71°C

**Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles

**Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles

**Dielectric Strength** — All Circuits to Ground — 1,500 Vrms  
Circuit to Circuit — 1,500 Vrms  
Coil to Ground and Aux. Contacts — 1,000 Vrms

**Insulation Resistance, Initial** — 100 megohm min.

**Altitude** — 50,000 ft.

**Weight, Max.** — 2.44 lbs

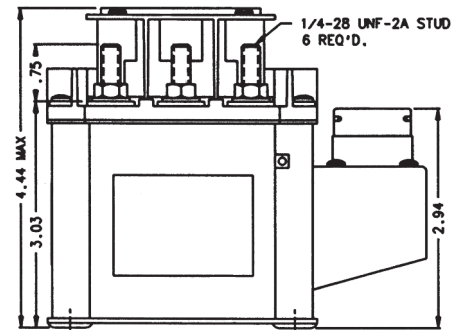
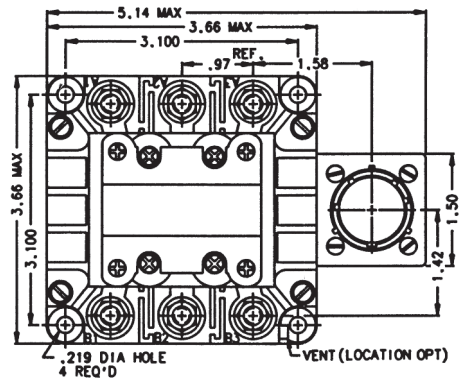
**Coil Characteristics**

**Duty Cycle** — Continuous, self-deenergizing

**Operating Voltage, Max.** — 30 Vdc

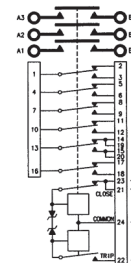
**Close Voltage @ 15 to 30 Vdc** — Resistance — 4.4 +10% Ohms  
Current — 5 Amp Max.

**Trip Voltage @ 15 to 30 Vdc** — Resistance — 5.0 +10% Ohms  
Current — 5 Amp Max.



Mounting Style A

**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

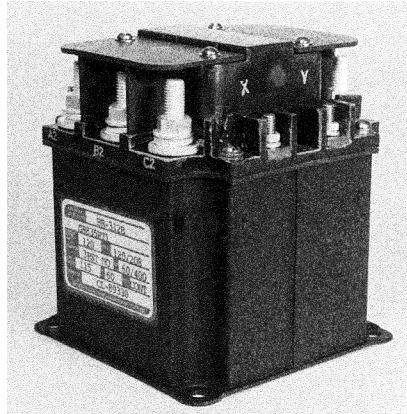
HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
B451	Gasket/Vented	A	Continuous, Self-Deenergizing	1	1616023-3



**B-312 Series, Rated up to 175 Amps, 253/440 VAC, 50-60 Hz**

**Product Facts**

- 3PST NO, Double break
- Gasket sealed
- 235/440 VAC, 50-60 Hz, 3 phase
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



**Performance Data**

**Electrical Characteristics**

**Contact Arrangement** — 3PST NO, Double Break

**Rated Operating Voltage** — 253/440 VAC, 50-60 Hz, 3 phase

**Current, Resistive** — 175 Amps

**Current, Inductive** — B312DB — 70 Amps

**Current, Motor** — 150 Amps

**Current, Rupture** — 1,500 Amps

**General Characteristics**

**Temperature Range** — -55°C to +71°C

**Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles

**Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles

**Dielectric Strength** — All Circuits to Ground — 1,500 Vrms  
Circuit to Circuit — 1,500 Vrms  
Coil to Ground and Aux. Contacts — 1,000 Vrms

**Weight, Max.** — 3.0 lbs

**Coil Characteristics**

**Duty Cycle** — Continuous, economizing

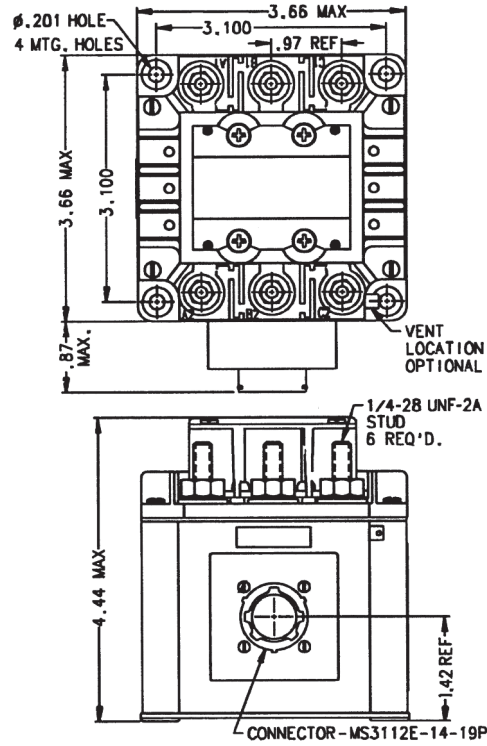
**Operating Voltage, Nom.** — 28 Vdc

**Pickup Voltage** — 18 Vdc

**Dropout Voltage** — B312DB — 1.5 to 7 Vdc  
B312CH — 1 to 7 Vdc

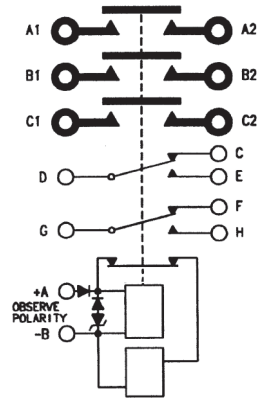
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

**B-312 Series, Rated up to 175 Amps, 253/440 VAC, 50-60 Hz (Continued)**



Mounting Style A

**Circuit Configurations (Consult factory for other available circuit configurations)**



Circuit Configuration 1

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
B-312DB	Gasket/Vented	A	Continuous, Economizing	1	1616004-7

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

**KA175 Series, Rated up to 175 Amps, 115 or 230 VAC, 400-800 Hz**

**Lightweight, High Performance**

**Product Facts**

- 3PST NO, Side stable
- Gasket sealed
- Buss bar mount



**Performance Data**

**Electrical Characteristics**

**Contact Arrangement** — 3PST NO, Side Stable  
**Rated Operating Voltage** — 115/230 VAC, 230/460 VAC  
 400-800 Hz  
**Resistive Rating** — 175 Amps

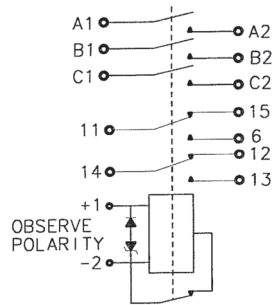
**General Characteristics**

**Temperature Range** — -55°C to +85°C  
**Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles  
**Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles  
**Weight, Max.** — 1.25 lbs

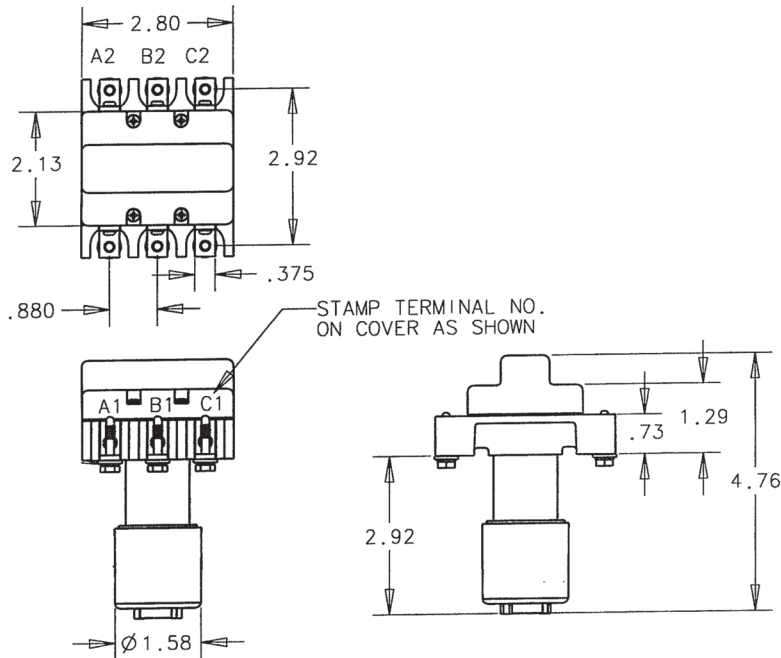
**Coil Characteristics**

**Duty Cycle** — Continuous, economizing  
**Operating Voltage, Nom.** — 28 Vdc  
**Pickup Voltage** — 18 Vdc  
**Dropout Voltage** — 1.0 to 7 Vdc

**Circuit Configurations**  
 (Consult factory for other available circuit configurations)



**Circuit Configuration 1**



**Mounting Style A**

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

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
KA175B3C	Gasket/Vented	A	Continuous, Economizing	1	2-1616960-7

**SA136F Series, Rated up to 175 Amps, 240/416 VAC**

**Product Facts**

- 3PST NO, Side stable
- Gasket/Vented sealed



**Performance Data**

**Electrical Characteristics**

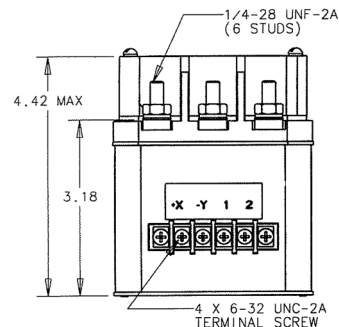
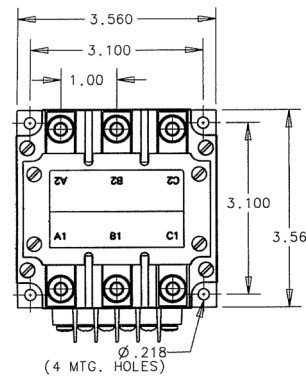
- Main Contacts** —
- Contact Arrangement** — 3PST NO, Double Break
- Rated Operating Voltage** — 240/416 VAC, 50/60/400 Hz
- Resistive Rating** — 240 Amps
- Rupture Rating** — 2400 Amps
- Auxiliary Contacts** — 1SPST NO
- Contact Arrangement** — 4PST NC
- Voltage, Nom.** — 28 Vdc
- Resistive Rating** — 5 Amps, 28 Vdc; 10 Amps, 120 VAC

**General Characteristics**

- Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles
- Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles
- Weight, Max.** — 2.8 lbs

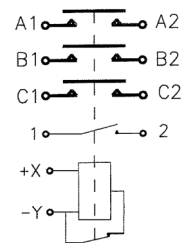
**Coil Characteristics**

- Duty Cycle** — Continuous, economizing
- Operating Voltage, Nom.** — 24 Vdc
- Pickup Voltage, Max.** — 18 Vdc
- Dropout Voltage** — 1 to 10 Vdc
- Coil Resistance** — 240A Rupture — 2400A



**Mounting Style A**

**Circuit Configurations** (Consult factory for other available circuit configurations)



**Circuit Configuration 1**

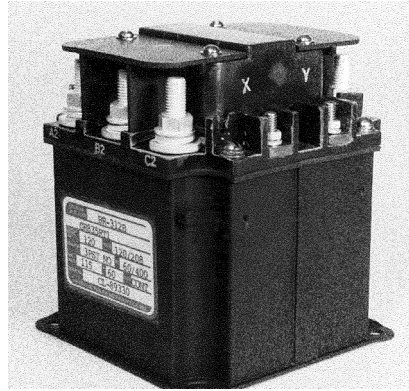
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
SA136F	Gasket/Vented	A	Continuous	1	1616948-7

**B-312 Series, Rated up to 200 Amps, 115 VAC, 400 Hz**

**Product Facts**

- 3PST NO
- Gasket sealed
- 115 VAC, 400 Hz



**Performance Data**

**Electrical Characteristics**

**Main Contacts —**  
**Contact Arrangement —** 3PST NO, Double Break

**Rated Operating Voltage —**  
 115 VAC, 400 Hz

**Resistive Rating —** 200 Amps

**Inductive Rating —** 200 Amps

**Rupture Rating —** 2000 Amps

**Auxiliary Contacts —**

**Contact Arrangement —** 4PST NC  
**Voltage, Nom. —** 28 Vdc or 115 VAC, 400 Hz

**Resistive Rating —** 5 Amps

**General Characteristics**

**Temperature Range —**  
 -55°C to +71°C

**Operating Cycles (Life) at Rated Resistive Load, Min. —** 50,000 cycles

**Operating Cycles (Life) Mechanical, Min. —** 100,000 cycles

**Weight, Max. —** 3 lbs

**Coil Characteristics**

**Duty Cycle —** Continuous, economizing

**Operating Voltage, Nom. —** 28 Vdc

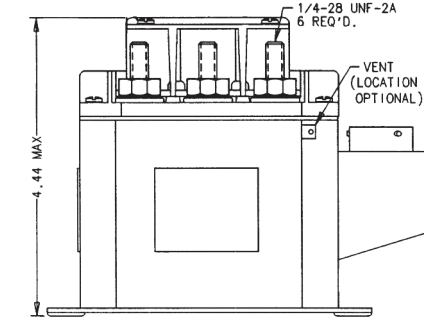
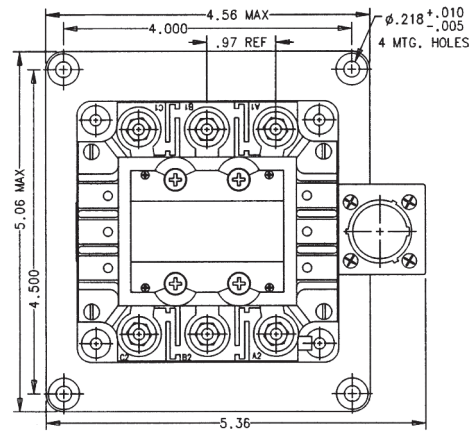
**Pickup Voltage, Max. —** 18 Vdc

**Dropout Voltage —** 1 to 7 Vdc

**Coil Resistance —**

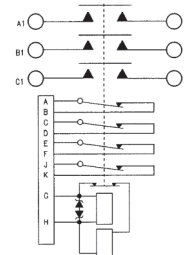
Pickup — 12 Ohms ± 20%

Holding — 60 Ohms ± 20%



**Mounting Style A**

**Circuit Configurations** (Consult factory for other available circuit configurations)



**Circuit Configuration 1**

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

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
B-312CV	Gasket/Vented	A	Continuous, Economizing	1	1616004-5

**B-393 Series, Rated up to 260 Amps, 120/208 VAC, 400 Hz**

**Product Facts**

- 3PDT, Center off, double break
- Gasket sealed

**Performance Data**

**Electrical Characteristics**

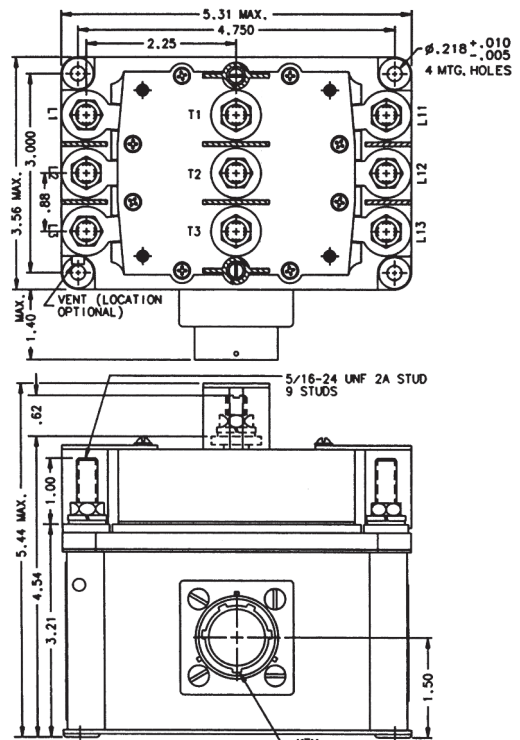
- Main Contacts** —
- Contact Arrangement** — 3PDT, Center Off, Double Break
- Rated Operating Voltage** — 120/208 VAC, 400 Hz
- Resistive Rating** — 260 Amps
- Inductive Rating** — 260 Amps
- Rupture Rating** — 2600 Amps
- Auxiliary Contacts** —
- Contact Arrangement** — 4PST NO, 2PST NC
- Resistive Rating** — 5 Amps
- Inductive Rating** — 5 Amps
- Lamp Rating** — 5 Amps

**General Characteristics**

- Temperature Range** — -55°C to +71°C
- Operating Cycles (Life) at Rated Resistive Load** — 50,000 cycles
- Operating Cycles (Life) Mechanical** — 100,000 cycles
- Altitude Max.** — 40,000 ft.
- Weight** — 5 lbs

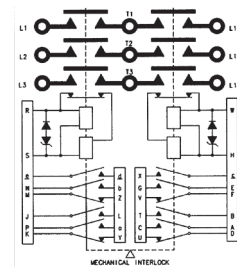
**Coil Characteristics**

- Duty Cycle** — Continuous, economizing
- Operating Voltage, Nom.** — 28 Vdc
- Pickup Voltage, Max.** — 18 Vdc
- Dropout Voltage** —
- R-S Coil — 14 Vdc
- W-H Coil — 7 Vdc



Mounting Style A

**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1

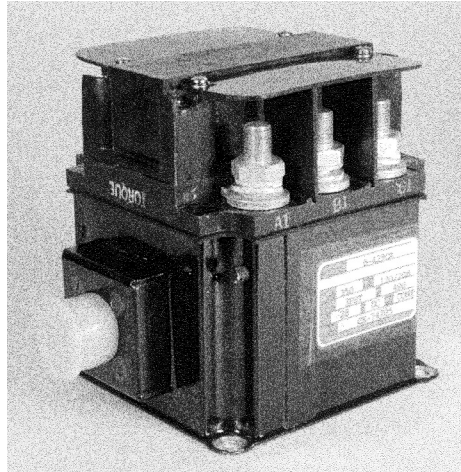
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
B-393T	Gasket/Vented	A	Continuous, Economizing	1	1616044-5

**B-429 Series, 260/350 Amps, 115/200 VAC or 120/208 VAC**

**Product Facts**

- 3PST NO, Double break
- Gasket sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



**Performance Data**

**Electrical Characteristics**

**Contact Arrangement** — 3PST NO, Double Break

**Rated Operating Voltage** —  
 B-429-1 and B-429W — 115/200 VAC, 400 Hz, 3 phase  
 B-429CA — 120/208 VAC

**Resistive Rating** —  
 B-429-1 — 275 Amps  
 B-429CA — 350 Amps  
 B-429W — 260 Amps

**General Characteristics**

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

**Operating Cycles (Life) at Rated Resistive Load, Min.** —  
 50,000 cycles

**Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles

**Dielectric Strength** —  
 All Circuits to Ground — 1,500 Vrms  
 Circuit to Circuit — 1,500 Vrms  
 Coil to Ground and Aux. Contacts — 1,000 Vrms

**Insulation Resistance, Initial** —  
 100 megohm min.

**Altitude** — 50,000 ft.

**Weight, Max.** — 4.0 lbs

**Coil Characteristics**

**Duty Cycle** — Continuous, economized with suppression (Type A or B, See diagram below)

**Operating Voltage, Nom.** — 28 Vdc

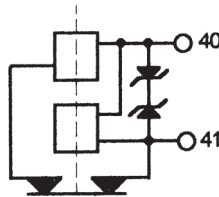
**Pickup Voltage, Max.** —  
 Coil Type A — 15 Vdc  
 Coil Type B — 18 Vdc

**Dropout Voltage, Max.** —  
 Coil Type A — 1.5 to 10 Vdc  
 Coil Type B — 1 to 7 Vdc

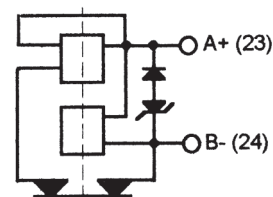
**Coil Current Inrush** —  
 Coil Type A — 6 Amps  
 Coil Type B — 2.7 Amps

**Coil Current Holding** —  
 Coil Type A — 0.6 Amps  
 Coil Type B — 0.56 Amps

**Coil Type**



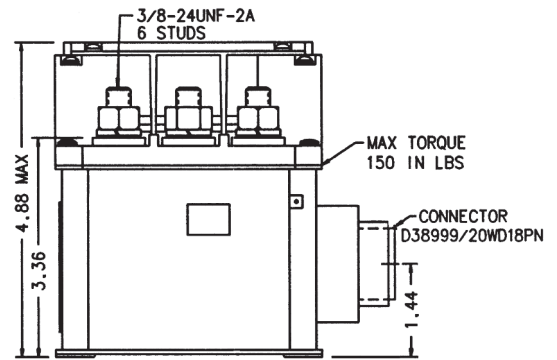
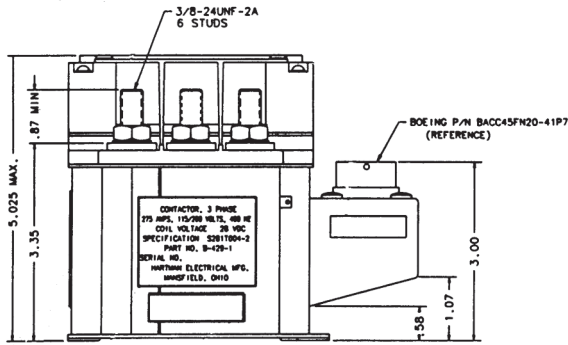
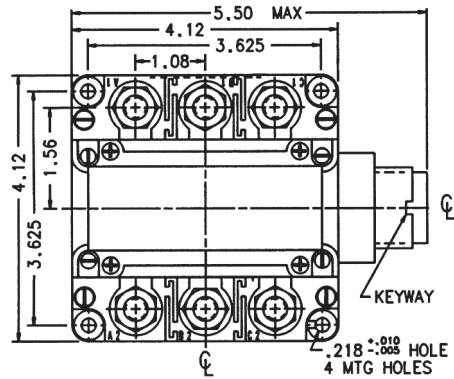
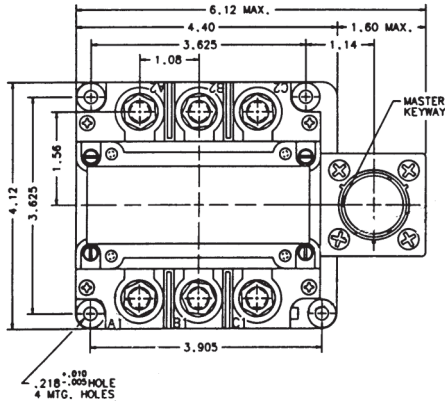
**A** — Continuous, Economized with Suppression



**B** — Continuous, Economized with Suppression

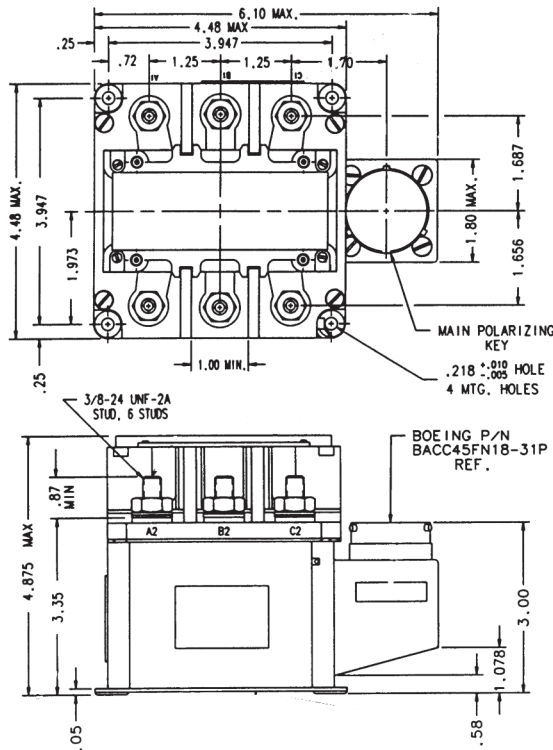
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

**B-429 Series, 260/350 Amps, 115/200 VAC or 120/208 VAC (Continued)**



Mounting Style A

Mounting Style B



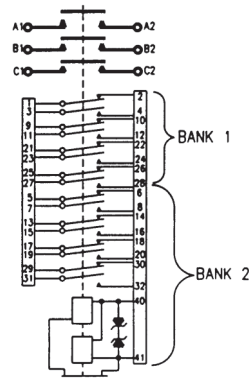
Mounting Style C

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

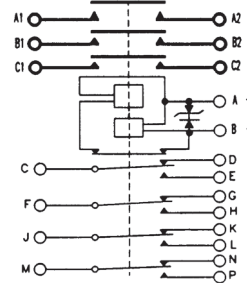


**B-429 Series, 260/350 Amps, 115/200 VAC or 120/208 VAC** (Continued)

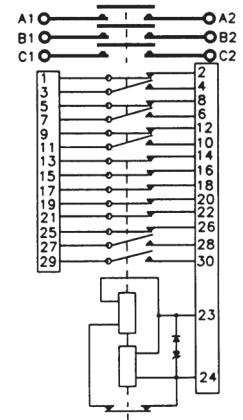
**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 2



Circuit Configuration 3

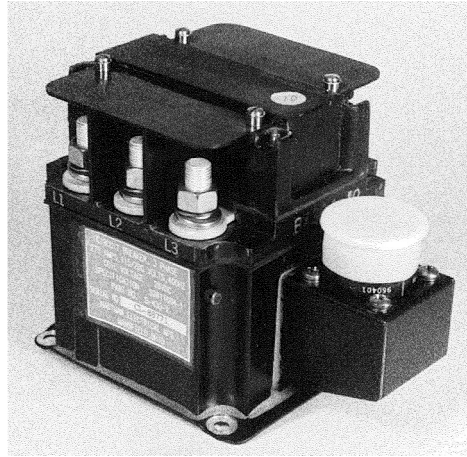
HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
B-429W	Gasket/Vented	B	B	3	1616005-6
B-429-1	Gasket/Vented	A	A	1	1616005-1
B-429CA	Gasket/Vented	A	B	2	1616005-4

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

**B-430 Series, Rated up to 275 Amps, 115/200 VAC, 400 Hz**

**Product Facts**

- 3PST, Double break, magnetic latching
- Gasket sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



**Performance Data**

**Electrical Characteristics**

**Contact Arrangement** — 3PST, Double Break, Magnetic Latching  
**Rated Operating Voltage** — 115/200 VAC, 400 Hz, 3 phase  
**Resistive Rating** — 275 Amps  
**Interrupt Rating** — 2,000 Amps

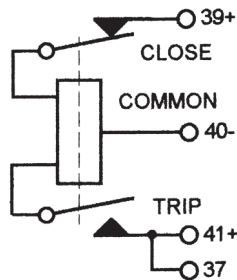
**General Characteristics**

**Temperature Range** — -55°C to +85°C  
**Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles  
**Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles  
**Dielectric Strength** — All Circuits to Ground — 1,500 Vrms  
 Circuit to Circuit — 1,500 Vrms  
 Coil to Ground and Aux. Contacts — 1,000 Vrms  
**Insulation Resistance, Initial** — 100 megohm min.  
**Altitude** — 45,000 ft.  
**Weight, Max.** — 4.0 lbs

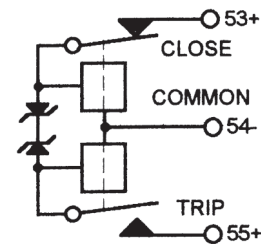
**Coil Characteristics**

**Duty Cycle** — B-430-1 — Continuous, self-deenergizing (Type A, See diagram below)  
 B-430Z — Continuous, self-deenergizing with suppression (Type B, See diagram below)  
**Operating Voltage Close, @ 85°C** — Min. — 15 Vdc  
 Max. — B-430-1 — 28 Vdc  
 B-430Z — 29 Vdc  
**Operating Voltage Trip, @ 85°C** — Min. — 15 Vdc  
 Max. — B-430-1 — 28 Vdc  
 B-430Z — 29 Vdc  
**Coil Current Closing, Max.** — 6 Amps  
**Coil Current Trip, Max.** — 6 Amps

**Coil Type**



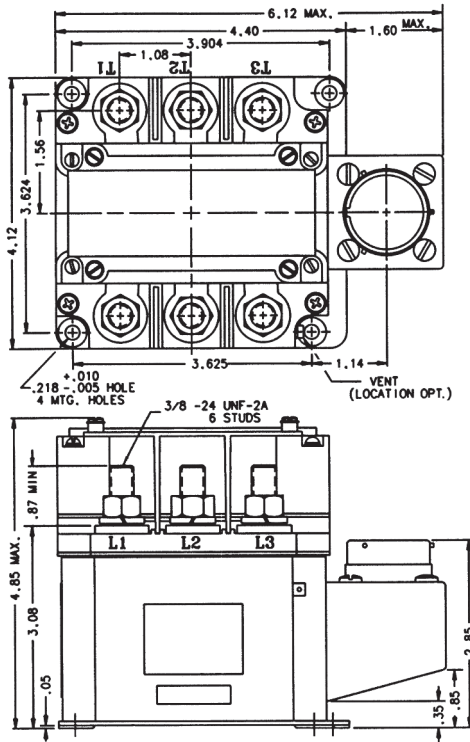
A — Continuous, Self-Deenergizing



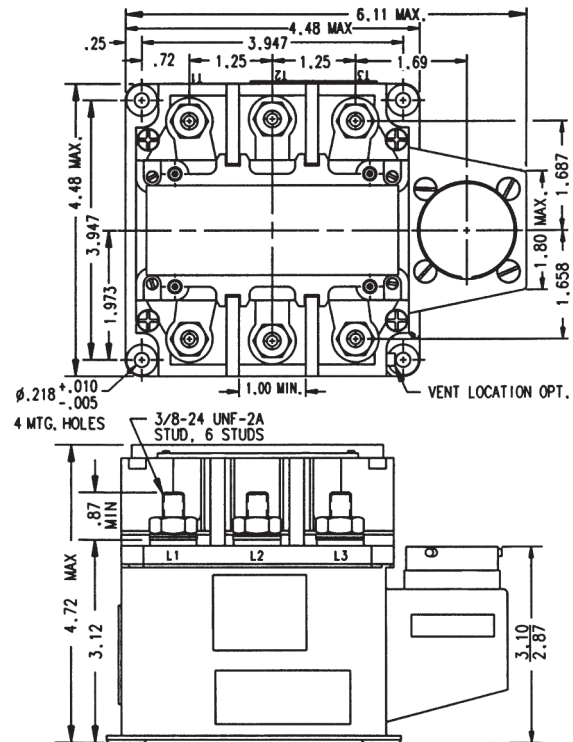
B — Continuous, Self-Deenergizing with Suppression

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

**B-430 Series, Rated up to 275 Amps, 115/200 VAC, 400 Hz (Continued)**

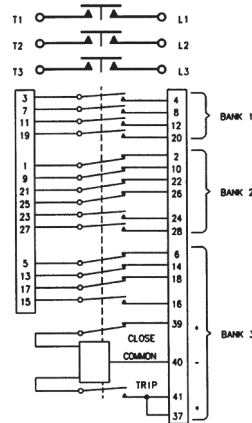


Mounting Style A

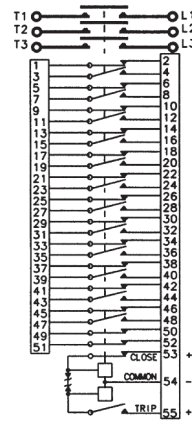


Mounting Style B

**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 2

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
B-430-1	Gasket/Vented	A	A	1	1616023-1
B-430Z	Gasket/Vented	B	B	2	1616023-2

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

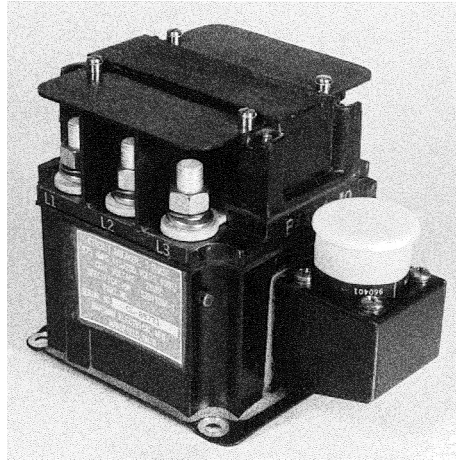
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**B-484 Series, Rated up to 500 Amps, 115/200 VAC, 400 Hz**

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**Product Facts**

- 3PDT, Magnetic latching
- Gasket sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106

**Performance Data****Electrical Characteristics**

**Contact Arrangement** — 3PDT, Magnetic Latching

**Rated Operating Voltage** — 115/200 VAC, 400 Hz, 3 phase

**Resistive Rating, Continuous** — 500 Amps

**Inductive Rating** — 500 Amps

**Interrupt Rating** — 6,500 Amps

**General Characteristics**

**Temperature Range** — -54°C to +71°C

**Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles

**Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles

**Dielectric Strength** — All Circuits to Ground — 1,500 Vrms  
Circuit to Circuit — 1,500 Vrms  
Coil to Ground and Aux. Contacts — 1,000 Vrms

**Insulation Resistance, Initial** — 100 megohm min.

**Altitude** — 45,000 ft.

**Weight, Max.** — 4.5 lbs

**Coil Characteristics**

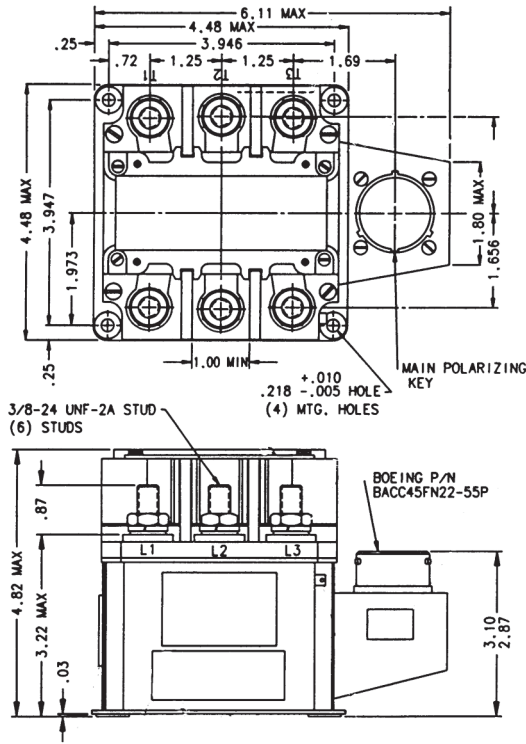
**Duty Cycle** — Continuous, self-deenergizing

**Close Voltage** — Min. — 15 Vdc  
Max. — 29 Vdc

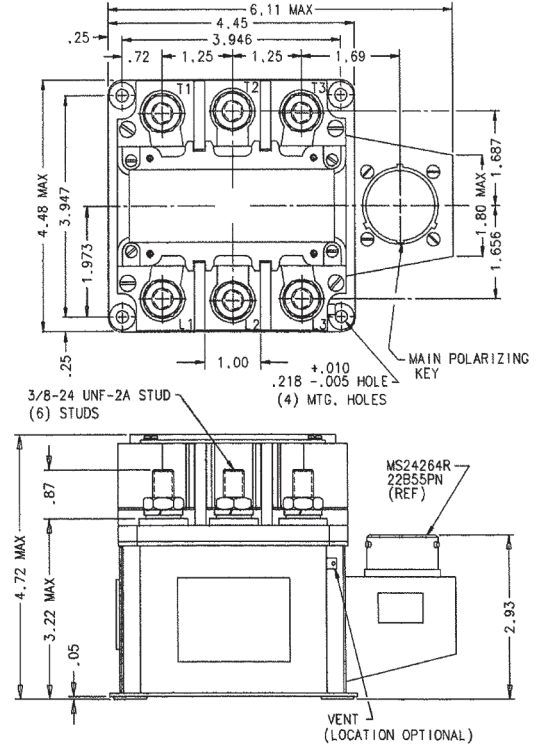
**Trip Voltage** — Min. — 15 Vdc  
Max. — 29 Vdc

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

**B-484 Series, Rated up to 500 Amps, 115/200 VAC, 400 Hz (Continued)**

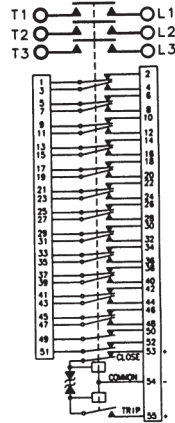


Mounting Style A



Mounting Style B

**Circuit Configurations (Consult factory for other available circuit configurations)**



Circuit Configuration 1

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
B-484	Gasket/Vented	A	Continuous, Self-Deenergizing	1	1616023-4
B-484C	Gasket/Vented	B	Continuous, Self-Deenergizing	1	1616023-5

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

**Cross Reference**

Main Current Rating	AC/DC	Rating	Main Contact Config.	Operating Mode	Aux. Contact Config.	Coil Voltage (VDC)	Seal Type	Duty Cycle	Coil Trans. Voltage	Hartman Part No.	TE Part No.		
25	AC	115	3PDT	Side Stable	–	28	Hermetic	Cont.	–	DH-14B	1-1616522-4		
		115	3PDT	Side Stable	–	115V	Hermetic	Cont.	–	DHR-14B	1-1616037-2		
		115/200	3PDT	Side Stable	–	28-31	Hermetic	Cont.	42	DH-14B-3	1616037-1		
		115/200	3PDT	Side Stable	–	115V	Hermetic	Cont.	–	DHR-14BA	1-1616037-3		
		115/200	3PST NO	Side Stable	–	28	Hermetic	Cont.	42	DH-14CE	1616017-1		
30	AC	115	3PDT	Center Off	–	115V	Hermetic	Cont.	–	DHR-18-1	1616050-9		
		115	DPDT	Side Stable	–	115V	Hermetic	Cont.	–	DHR-7K	1616522-2		
		115	3PDT	Side Stable	SPST NO	28	Hermetic	Cont.	–	DH-7BB	1616037-7		
		115/200	3PDT	Side Stable	DPDT	18-32	Hermetic	Cont.	50	DH-7ZAB	1-1616037-1		
		120/208	3PDT	Side Stable	–	115V	Hermetic	Cont.	–	DHR-7B	1-1616037-6		
		120/208	3PDT	Side Stable	–	115V	Hermetic	Cont.	–	DHR-7BE	1-1616037-7		
		115	3PST	Center Off	–	28	Gasket/Vented	Cont.	20	D-18F	1616048-4		
		50	AC	115/200	3PDT	Center Off	–	28	Gasket/Vented	Cont.	–	D-18	1616048-1
				115/200	3PDT	Center Off	SPST NO Each Side	28	Gasket/Vented	Cont.	–	D-180A	1616048-2
				115/200	3PDT	Center Off	–	28	Gasket/Vented	Cont.	45	D-18AA	1616048-3
115/200	3PDT			Center Off	6PDT	28	Gasket/Vented	Cont.	45	D-18ZZC	1-1616957-3		
115	3PDT			Center Off	–	28	Hermetic	Cont.	–	DH-18	1616050-1		
115/200	3PDT			Center Off	–	28-30	Hermetic	Cont.	–	DH-18Y	1616524-3		
115	SPDT			Center Off	–	35	Gasket/Vented	Cont.	–	DR-18E-5	1616099-1		
115/200	3PST			Side Stable	–	28	Gasket/Vented	Cont.	50	D-7M	1616016-2		
115/230	SPST			Side Stable	–	28	Gasket/Vented	Cont.	–	D7MA	1616016-3		
115/200	3PST NC			Side Stable	SPDT	28	Gasket/Vented	Cont.	45	D-7MM	1616016-4		
115/200	3PST NO			Side Stable	SPST NO SPST NC	115	Gasket/Vented	Cont.	–	DR-7VC	1616018-1		
115	3PST NO			Side Stable	SPST NO	28	Hermetic	Cont.	–	DH-7N	1616017-9		
115	3PST NO			Side Stable	SPST NO(2) SPST NC	28	Hermetic	Cont.	50	DH-7ZG-1	1-1616017-0		
50	AC			115	3PST NO	Side Stable	–	120V	Hermetic	Cont.	–	DHR-7M	1616518-2
				115	3PST NO	Side Stable	DPST NC SPST NO	115V	Hermetic	Cont.	–	DHR-7ZG	1-1616017-2
		115/200	3PDT	Side Stable	SPDT	28-30	Hermetic	Cont.	50	DH-7GR	1616037-9		
		115/200	3PDT	Side Stable	SPDT	28	Gasket/Vented	Cont.	45	D-7GRZ	1616036-5		
		115/208	3PDT	Side Stable	–	18-30	Gasket/Vented	Cont.	–	D-7BS	1616036-1		
		115/208	3PDT	Side Stable	SPDT	28	Gasket/Vented	Cont.	–	D-7GR	1616036-2		
		115/208	SPDT	Side Stable	SPDT	28	Gasket/Vented	Cont.	–	D-7GR-2	1616036-3		
		115/208	3PDT	Side Stable	SPDT	28	Gasket/Vented	Cont.	45	D-7GR-3	1616036-4		
		115	3PDT	Side Stable	SPST NC	18-30	Hermetic	Cont.	–	DH-7BC	1616037-8		
		50	AC	115	3PST NO	Side Stable	–	28	Hermetic	Cont.	–	BH-316	1616008-4
115	3PST NO			Side Stable	1NO, 1NC	28	Hermetic	Cont.	–	BH-316A	1616008-5		
115	3PST NO			Side Stable	–	28	Hermetic	Cont.	45	BH-316C	1-1616520-0		
115/200	TPST NO			Side Stable	–	28	Hermetic	Cont.	–	BH-316D	1616008-6		
60	AC	200	3PDT	Side Stable	SPDT	28	Gasket/Vented	Cont.	–	B-138BH	1616028-1		
		200	3PDT	Side Stable	DPDT	28	Gasket/Vented	Cont.	–	B-138XAH	1616028-2		
		115/200	3PDT	Side Stable	DPDT	28	Gasket/Vented	Cont.	42	B-138XEH	1616028-3		
		200	3PDT	Center Off	SPST NO	28	Gasket/Vented	Cont.	–	B-140V	1-1616043-0		
		115/200	3PDT NO	Center Off	DPST NC	28	Gasket/Vented	Cont.	–	B-140BH	1616043-9		
		120/208	3PDT NO	Center Off	6PDT	28	Gasket/Vented	Cont.	75	B-140AP-1	1616043-7		
115/200	3PST NO	Side Stable	4PDT	28	Gasket/Vented	Cont.	45	B-138S	1616002-5				

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

**Cross Reference** (Continued)

Main Current Rating	AC/DC	Rating	Main Contact Config.	Operating Mode	Aux. Contact Config.	Coil Voltage (VDC)	Seal Type	Duty Cycle	Coil Trans. Voltage	Hartman Part No.	TE Part No.		
100	AC	115/200	3PDT	Side Stable	SPST NC	28	Gasket/Vented	Cont.	–	D-25BD	1616034-3		
		115/200	3PDT	Side Stable	–	28	Hermetic	Cont.	–	DH-25B	1616037-2		
		115/200	3PDT NC	Side Stable	DPDT	28	Hermetic	Cont.	–	DH-25BA	1616037-3		
		115/200	3PDT	Side Stable	–	115	Hermetic	Cont.	–	DHR-25BG	1-1616037-5		
		115/200	3PDT	Center Off	–	28	Gasket/Vented	Cont.	–	D-31C	1616049-1		
120	AC	115/200	3PDT	Center Off	5PST NC	28	Gasket/Vented	Cont.	–	D-31TH	1616524-5		
		115/208	3PDT	Center Off	6PDT	28	Gasket/Vented	Cont.	42	D-31DB	1616049-2		
		115/208	3PDT	Center Off	4PDT	18-30	Hermetic	Cont.	42	DH-31DAA	1616050-6		
		115/200	3PDT	Center Off	6PDT	28	Hermetic	Cont.	–	DH-31A	1616050-4		
		115/208	3PDT	Center Off	4PDT	18-30	Hermetic	Cont.	42	DH-31DA	1616050-5		
		115/200	3PDT	Center Off Latching	6PDT	18-30	Hermetic	Cont.	50	DHL-31B	1616050-8		
		115/200	3PST NO	Side Stable	(1)SPST NC (1) SPDT	28	Gasket/Vented	Cont.	–	D-25CF	1616015-1		
		115/200	3PST NO	Side Stable	(1)SPST NO (1) SPST NC	28	Hermetic	Cont.	42	DH-25CU	1616017-4		
		125	AC	115/200	3PDT	Side Stable	DPDT	28	Gasket/Vented	Cont.	45	D-25BAH	1616034-2
		130	AC	115/200	3PST NO	–	3PST NO	28	Gasket	Cont.Econ	–	B309A	1-1616975-7
175	AC	115/200	3PST	Mag Latching	6PDT	15-30	Gasket/Vented	Cont.	42	B-451	1616023-3		
		253/440	3PST NO	–	DPDT	28	Gasket/Vented	Cont.Econ.	45	B-312DB	1616004-7		
		115	3PST NO	Side Stable	2PDT	28	Gasket/Vented	Cont. Econ.	–	SA-136F	1616948-7		
200	AC	115/200	3ST NO	Side Stable	2DT	28	Gasket	Cont. Econ.	42	KA175B3C	2-1616960-7		
		115	3PST NO	–	4PST NC	28	Gasket/Vented	Cont. Econ.	45	B-312CV	1616004-5		
260	AC	120/208	3PDT	Center Off	4PST NO 2PST NC	28	Gasket/Vented	Cont. Econ.	45	B-393T	1616044-5		
		115/200	3PST NO	Side Stable	(5)SPST NO (9) SPST NC	28	Gasket/Vented	Cont. Econ.	45	B-429W	1616005-6		
275	AC	115/200	3PST	Mag Latching	(7)SPST NO (7)2PST NC	28	Gasket/Vented	Cont. Econ.	45	B-430-1	1616023-1		
		115/200	3PST	Mag Latching	(12)SPST NO (14) SPST NC	28	Gasket/Vented	Cont. Econ.	45	B-430Z	1616023-2		
275	AC	115/200	3PST NO	Side Stable	(8)SPST NO	28	Gasket/Vented	Cont. Econ	45	B-429-1	1616005-1		
350	AC	120/208	3PST NO	Side Stable	4SPDT	28	Gasket/Vented	Cont.	45	B-429CA	1616005-4		
500	AC	115/200	3PST	Mag Latching	(12)SPST NO (14)2PST NC	15-29	Gasket/Vented	Cont.	45	B-484	1616023-4		
		115/200	3PST	Mag Latching	(12)SPST NO (14) SPST NC	15-29	Gasket/Vented	Cont.	45	B-484C	1616023-5		

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

## K Series Connectors

### Product Facts

- Light weight
- Small package size
- Small footprint
- Easy to package in panel assemblies
- Buss bar mount or chassis mount
- Designed to meet the applicable portions of MIL-PRF-6106
- 10X rupture current



TE HARTMAN brand of K Series contactors offer outstanding performance and reliability in a highly efficient package. The HARTMAN brand K-Series are among the smallest and lightest 200-1000 ampere DC contactors available in the aerospace industry.

These highly flexible buss bar mounted or chassis mounted units are designed for either continuous or start duty applications in the DC power distribution systems of military and commercial aircraft and ground vehicles.

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



## K Series, Rated up to 200 Amps, 28 Vdc

### Product Facts

- SPST NO, Double break
- Buss bar or chassis mount available
- Gasket sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

**Contact Arrangement** — SPST NO, Double Break  
**Rated Operating Voltage** — 28 Vdc  
**Resistive Rating** — 200 Amps  
**Rupture Rating** — 2,000 Amps

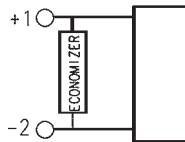
#### General Characteristics

**Temperature Range** — -40°C to +85°C  
**Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles  
**Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles  
**Dielectric Strength** — All Circuits to Ground — 1,500 Vrms  
 Circuit to Circuit — 1,500 Vrms  
 Coil to Ground and Aux. Contacts — 1,000 Vrms  
**Insulation Resistance, Initial** — 100 megohm min.  
**Altitude Max.** — 50,000 ft.  
**Weight, Max.** — .31-.41 lbs

#### Coil Characteristics

**Duty Cycle** — AC (Type A, See diagram below), Economized (Type B, See diagram below), Economized with suppression (Type C, See diagram below), Continuous or Intermittent (Type D & F, See diagram below), Continuous or Intermittent with suppression (Type E & G, See diagram below)  
**Operating Voltage, Nom.** — 28 Vdc  
**Pickup Voltage @ 20°C, Max.** — 18 Vdc

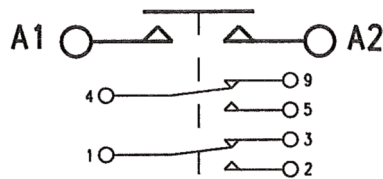
### Coil Type



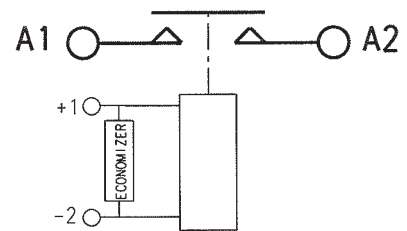
A — Electronic Economized with Suppression

### Circuit Configurations

(Consult factory for other available circuit configurations)



Circuit Configuration 1

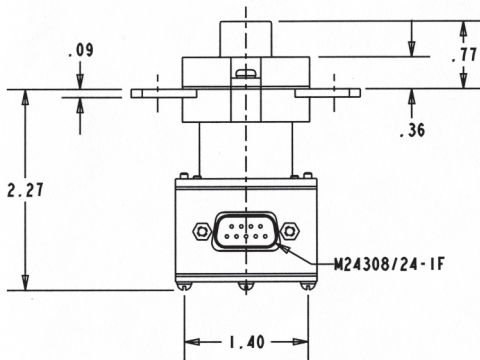
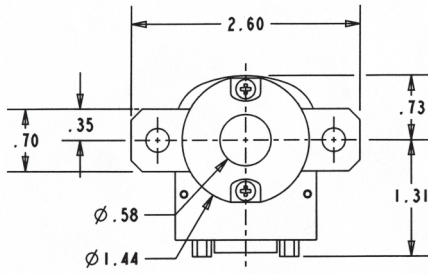


Circuit Configuration 2

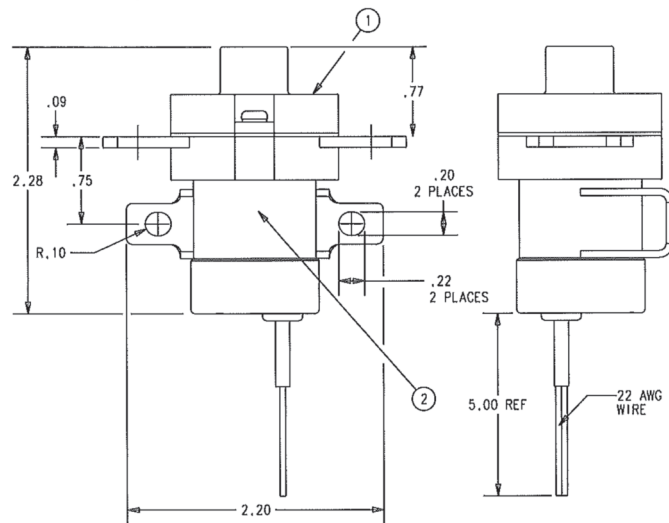
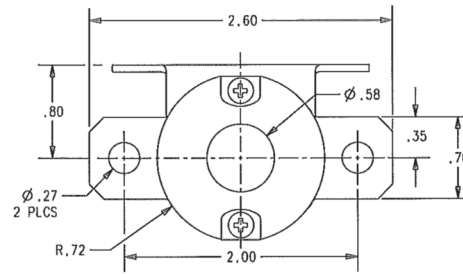
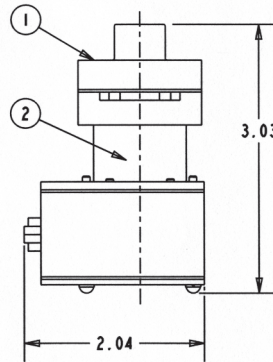
HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
K200A1C	Gasket	B	A	2	5-1616970-9
K200B3C02	Gasket	A	A	1	4-1616968-7
K200B1C	Gasket	C	A	2	6-1616970-0
K200A3C	Gasket	E	A	1	8-1616977-1

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

**K Series, Rated up to 200 Amps, 28 Vdc** (Continued)



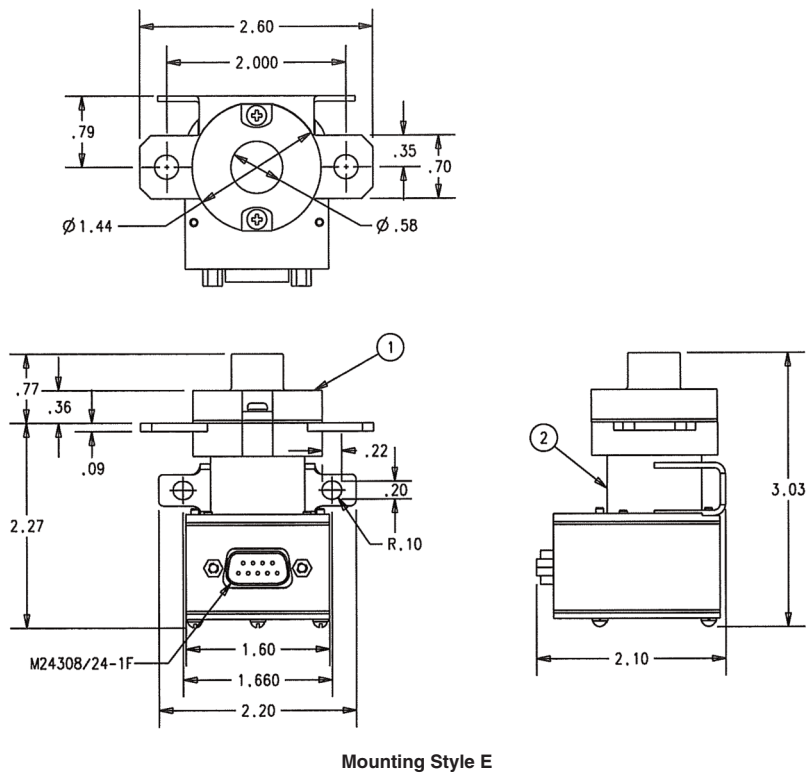
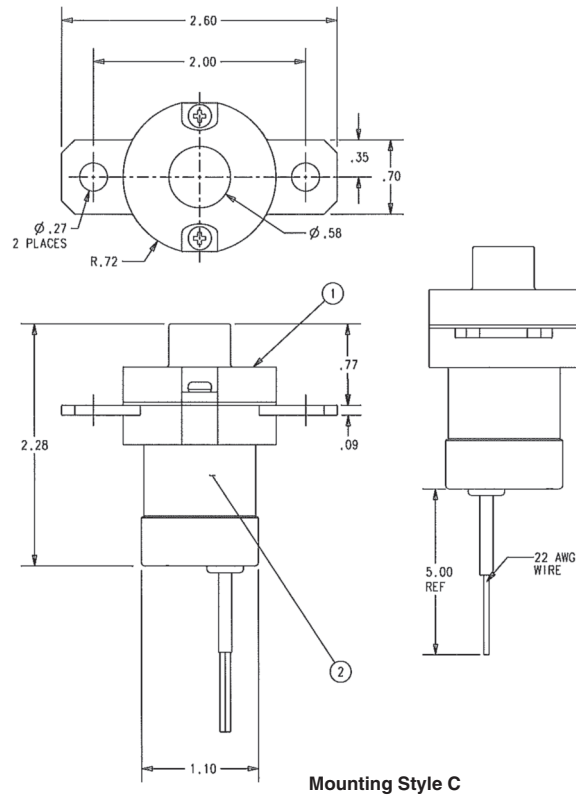
Mounting Style A



Mounting Style B

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

**K Series, Rated up to 200 Amps, 28 Vdc** (Continued)



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

## K Series, Rated up to 400 Amps, 28 Vdc



### Performance Data

#### Electrical Characteristics

- Contact Arrangement** — SPST NO, Double Break
- Rated Operating Voltage** — 28 Vdc
- Resistive Rating** — 400 Amps
- Overload Rating** — 3,200 Amps
- Rupture Rating** — 4,000 Amps

### General Characteristics

- Temperature Range** — -40°C to +85°C
- Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles
- Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles
- Dielectric Strength** — All Circuits to Ground — 1,250 Vrms  
Circuit to Circuit — 1,250 Vrms  
Coil to Ground and Aux. Contacts — 1,000 Vrms
- Altitude, Max.** — 50,000 ft.
- Weight, Max.** — .59 -.75 lbs

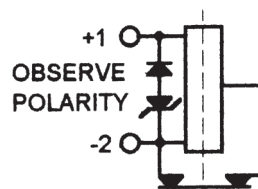
### Coil Characteristics

- Duty Cycle** — Economized with suppression (Type A, See diagram below), Continuous (Type B, See diagram below), Intermittent (Type C, See diagram below)
- Operating Voltage, Nom.** — 28 Vdc
- Pickup Voltage @ 250°C, Max.** — 18 Vdc - Economized and continuous duty coil  
12 Vdc - Intermittent duty coil
- Dropout Voltage, Max.** — 7 Vdc - Economized and continuous duty  
5 Vdc - Intermittent duty coil

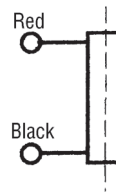
### Product Facts

- SPST NO, Double break
- Buss bar or chassis mount design
- Gasket sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106

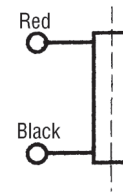
### Coil Type



A — Economized with Suppression



B — Continuous

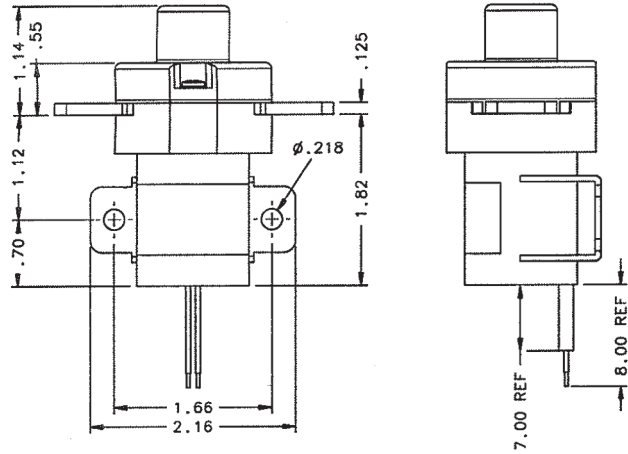
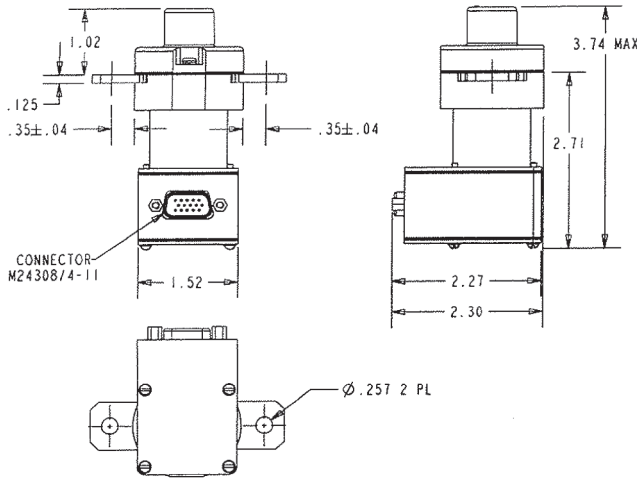
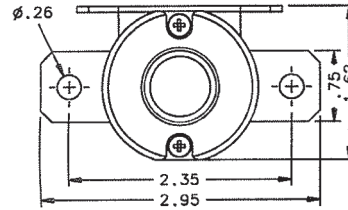
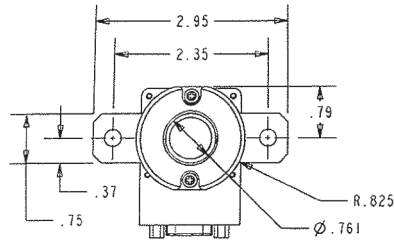


C — Intermittent

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
K4001A3C	Gasket Sealed	F	A	4	6-1616968-5
K4001B3C	Gasket Sealed	A	A	4	4-1616959-0
K400A1D	Gasket Sealed	B	C	1	—
K400A1F	Gasket Sealed	B	B	1	6-1616945-7
K400A4C1	Gasket Sealed	K	A	2	6-1616965-1
K400B1D	Gasket Sealed	E	C	1	8-1616968-4
K400B1F	Gasket Sealed	E	B	1	2-1616921-3
K400B3C05	Gasket Sealed	C	A	6	7-1616941-3
K400B712C	Gasket Sealed	D	A	7	5-1616946-6
K4001B7C	Gasket Sealed	A	A	5	4-1616959-8
K4001A7C	Gasket Sealed	F	A	5	6-1616970-7
K4001B2C	Gasket Sealed	A	A	3	6-1616970-8
K4001A2C	Gasket Sealed	F	A	3	6-1616970-6
K400A1F1	Gasket Sealed	G	B	1	4-1616964-5

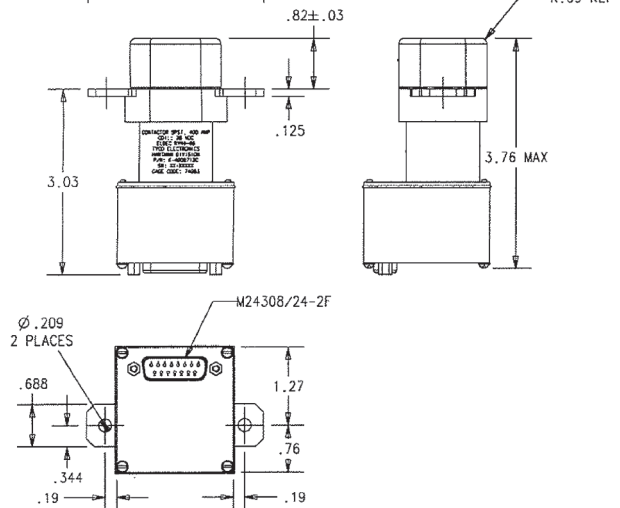
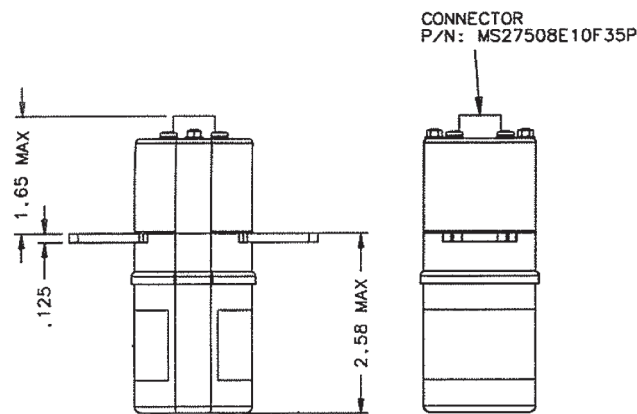
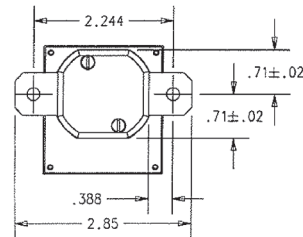
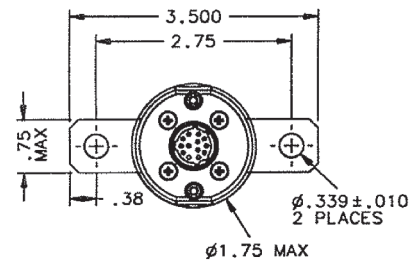
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

**K Series, Rated up to 400 Amps, 28 Vdc** (Continued)



Mounting Style A

Mounting Style B

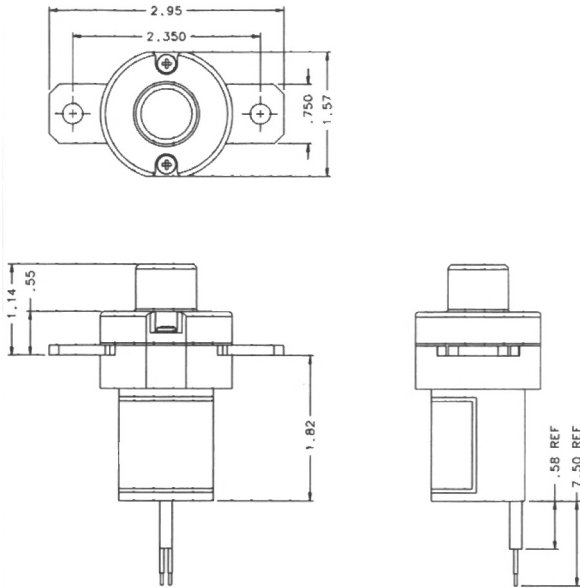


Mounting Style C

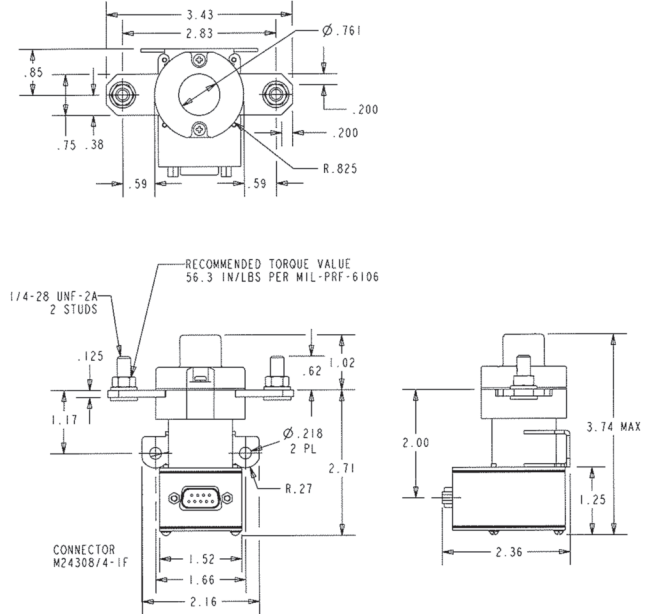
Mounting Style D

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

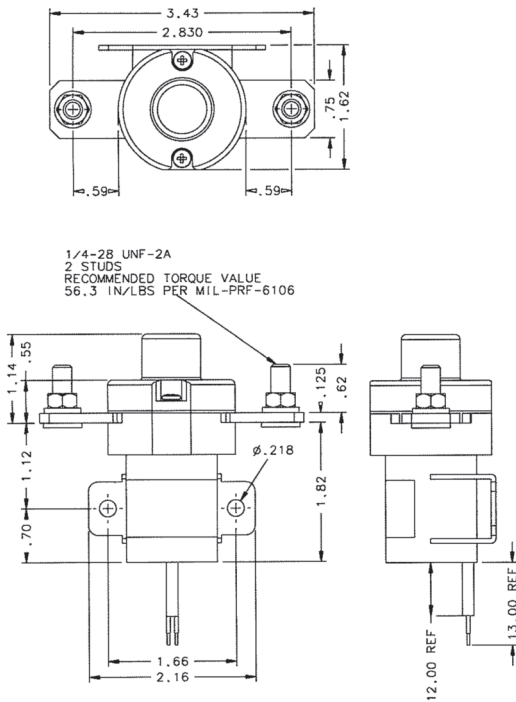
**K Series, Rated up to 400 Amps, 28 Vdc** (Continued)



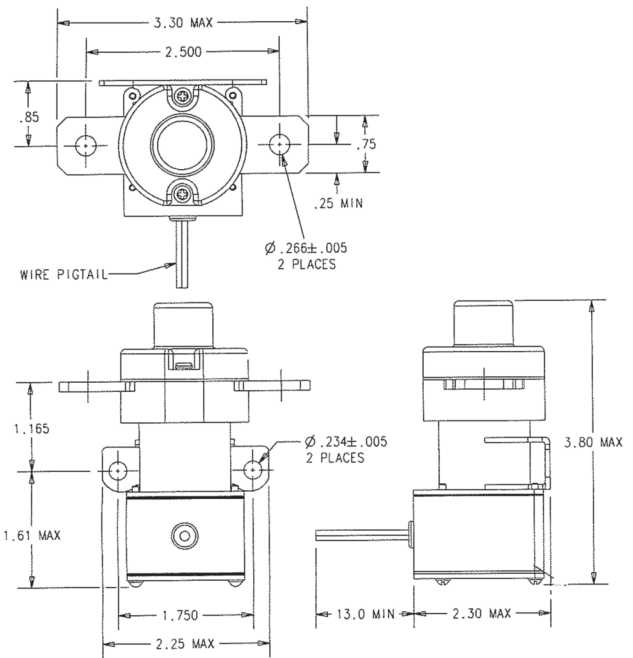
**Mounting Style E**



**Mounting Style F**



**Mounting Style G**

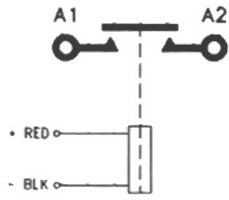


**Mounting Style K**

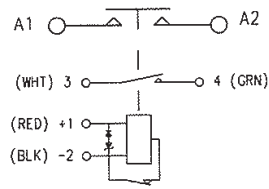
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

**K Series, Rated up to 400 Amps, 28 Vdc** (Continued)

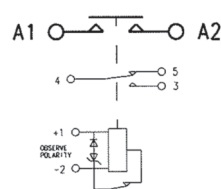
**Circuit Configurations** (Consult factory for other available circuit configurations)



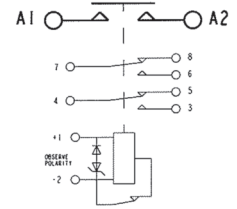
**Circuit Configuration 1**



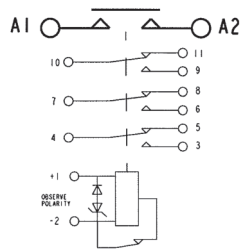
**Circuit Configuration 2**



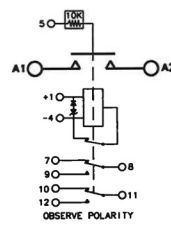
**Circuit Configuration 3**



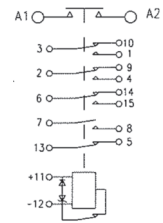
**Circuit Configuration 4**



**Circuit Configuration 5**



**Circuit Configuration 6**



**Circuit Configuration 7**

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

## K Series, Rated up to 500 Amps, 28 Vdc



### Performance Data

#### Electrical Characteristics

- Main Contacts** —
- Contact Arrangement** — SPST NO, Double Break
- Rated Operating Voltage** — 28 Vdc
- Resistive Rating** — 500 Amps
- Rupture Rating** — 5,000 Amps
- Auxiliary Contacts** —
- Aux. Contact Arrangement** — 3 SPDT
- Rated Operating Voltage** — 28 Vdc
- Resistive Rating** — 5 Amps
- Lamp Rating** — 1 Amps
- Low Level** — 1 mA @ 28 Vdc

#### General Characteristics

- Temperature Range** — -55°C to +85°C
- Operating Cycles (Life) at Rated Resistive Load** — 50,000 cycles
- Operating Cycles (Life) Mechanical** — 100,000 cycles
- Altitude** — 50,000 ft.
- Weight, Max.** — .88 lbs
- Operate Time @ 18 Vdc & 85°C, Max.** — 45 msec
- Dropout Time @ 32 Vdc, Max.** — 25 msec

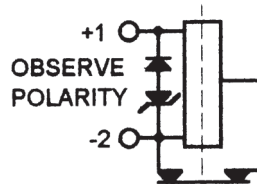
#### Coil Characteristics

- Duty Cycle** — Continuous, economizing
- Operating Voltage, Nom.** — 28 Vdc
- Pickup Voltage, Max.** — 18 Vdc
- Dropout Voltage** — 1 to 7 Vdc
- Inrush** — 5 Amps
- Hold @ 32 Vdc & -55°C** — 0.272 mA max.

### Product Facts

- SPST NO, Double break
- Buss bar or chassis mount designs
- Gasket sealed
- Multiple auxiliary contact choices
- Meets many requirements of MIL-PRF-6106

### Coil Type

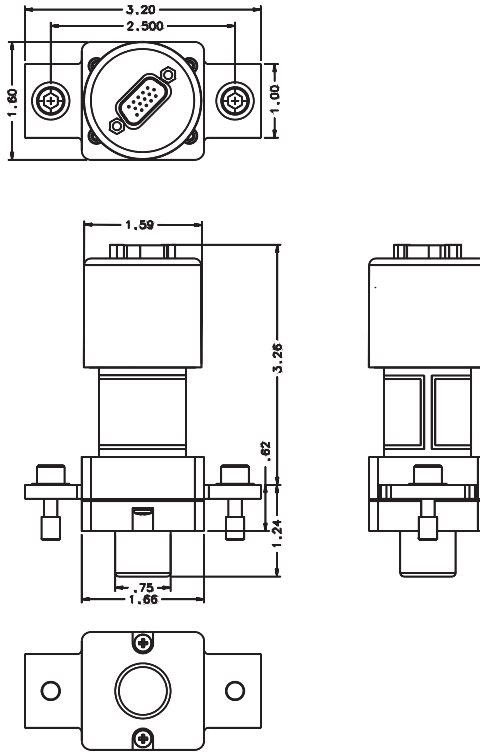


A — Economized with Suppression

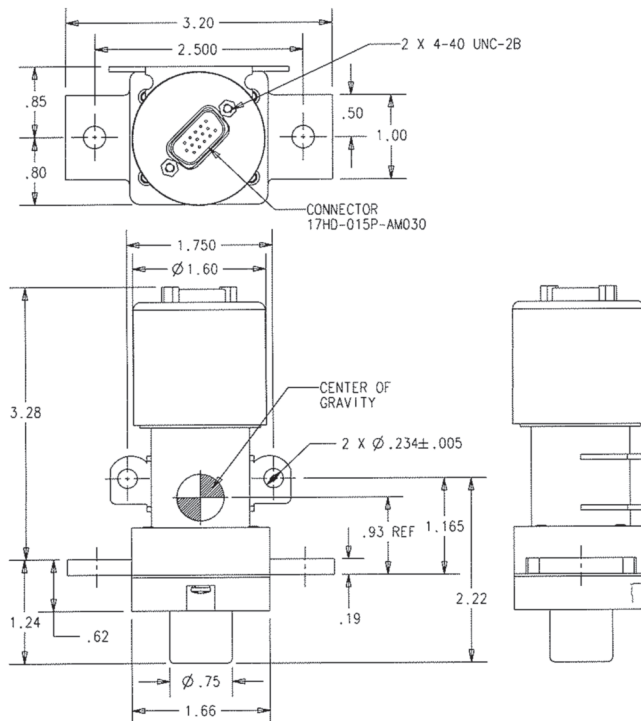
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.



**K Series, Rated up to 500 Amps, 28 Vdc** (Continued)



**Mounting Style A**

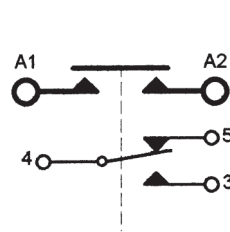


**Mounting Style B**

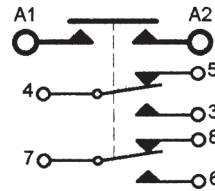
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

**K Series, Rated up to 500 Amps, 28 Vdc** (Continued)

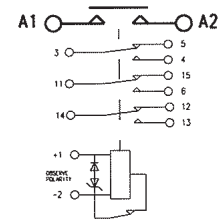
**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 2



Circuit Configuration 3

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
K500B2C	Gasket Sealed	A	A	1	7-1616927-0
K500A2C	Gasket Sealed	B	A	1	4-1616951-4
K500B3C	Gasket Sealed	A	A	2	7-1616970-0
K500A3C	Gasket Sealed	B	A	2	6-1616970-9
K500B7C01	Gasket Sealed	A	A	3	9-1616965-0
K500A7C01	Gasket Sealed	B	A	3	2-1616970-8

**K Series, Rated up to 500 Amps, 28 Vdc — Time Delay**

**Product Facts**

- SPST NO, Double break
- Delay on operator or release
- Chassis Mount (bus bar mount available)
- Gasket sealed
- Meets many requirements of MIL-PRF-6106

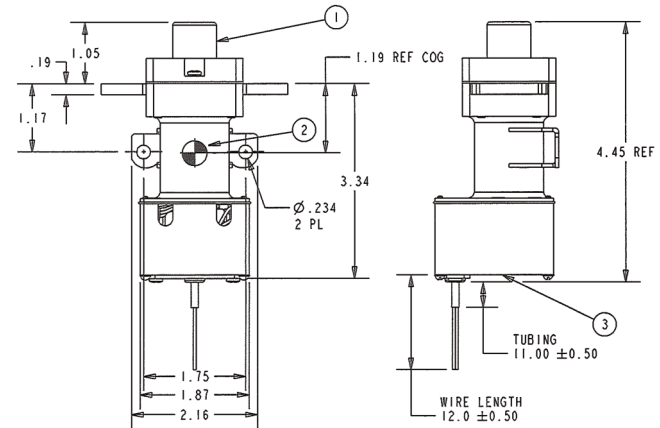
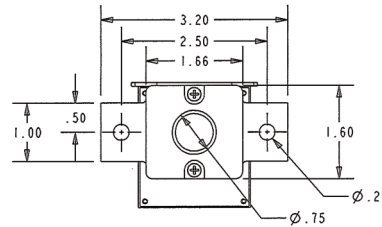
**Performance Data**

**Electrical Characteristics**

- Contact Arrangement** — SPST NO, Double Break
- Rated Operating Voltage** — 28 VDC
- Resistive Rating** — 500A
- Rupture Rating** — 5000A
- Delay on operate or release** — See note 1

**General Characteristics**

- Temperature Range** — -55°C to +85°C
- Minimum Electrical Cycles** — 50,000
- Minimum Mechanical Cycles** — 100,000 @ 125A
- Dielectric Strength** — 1000 Vrms
- Altitude** — 50,000 ft
- Weight, Max.** — 1.0 lbs
- Duty Cycle** — Intermittent or Continuous (See note 2)
- Operating Voltage Range** — 21 - 32 Vdc
- Drop Out Voltage** — 1 to 7 Vdc



**NOTES**

1. Delay can be tailored to meet customer need. Consult Factory.
2. Intermittent duty coil is recommended for starting applications where significant control voltage sags are possible. Consult factory to specify correct coil duty for your application.

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

**K-1000 Series, Rated up to 1,000 Amps, 28 Vdc**

**Product Facts**

- SPST NO, Double break
- Gasket sealed
- Meets many requirements of MIL-PRF-6106

**Performance Data**

**Electrical Characteristics**

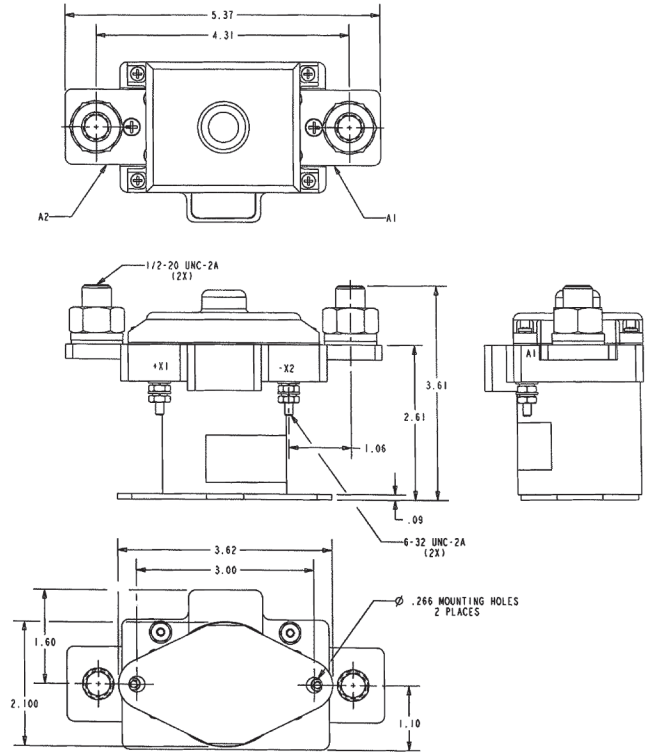
**Contact Arrangement** — SPST NO, Double Break  
**Rated Operating Voltage** — 28 Vdc  
**Resistive Rating** — 1,000 Amps

**General Characteristics**

**Temperature Range** — -55°C to +71°C  
**Operating Cycles (Life) at Rated Resistive Load** — 50,000 cycles  
**Operating Cycles (Life) Mechanical** — 100,000 cycles  
**Weight, Max.** — 2.75 lbs

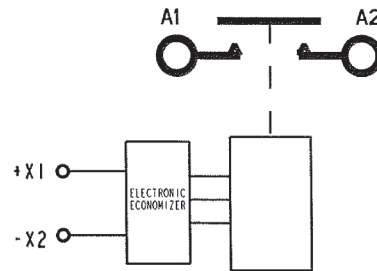
**Coil Characteristics**

**Duty Cycle** — Continuous, economizing  
**Operating Voltage, Nom.** — 28 Vdc  
**Pickup Voltage, Max. @25°C** — 18 Vdc  
**Dropout Voltage** — 1 to 8 Vdc  
**Current, Inrush, Max. @ 30 Vdc** — 7.0 Amps  
**Current, Hold, Max. @ 30 Vdc** — 1.0 Amps



**Mounting Style A**

**Circuit Configurations** (Consult factory for other available circuit configurations)



**Circuit Configuration 1**

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
K-1000A1F03	Gasket Sealed	A	Continuous	1	4-1616966-1

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

**Cross Reference**

Main Current Rating	AC/DC	Rating	Main Contact Config.	Operating Mode	Aux. Contact Config.	Coil Voltage	Seal Type	Duty Cycle	Coil Trans. Voltage (VDC)	Hartman Part No.	TE Part No.		
200	DC	28	SPST NO	Side Stable	2PDT	28	Gasket	Cont. Econ.	42	K200A1C	5-1616970-9		
		28	SPST NO	Side Stable	2PDT	28	Gasket	Cont. Econ.	42	K200B3C02	4-1616968-7		
		28	SPST NO	Side Stable	2PDT	28	Gasket	Cont. Econ.	42	K200B1C	6-1616970-0		
		28	SPST NO	Side Stable	2PDT	28	Gasket	Cont. Econ.	42	K200A3C	8-1616977-1		
400	DC	28	SPST NO	Side Stable	2PDT	28	Gasket	Cont. Econ.	42	K4001A3C	6-1616968-5		
		28	SPST NO	Side Stable	2PDT	28	Gasket	Cont. Econ.	42	K4001B3C	4-1616959-0		
		28	SPST NO	Side Stable	None	28	Gasket	Intermittent	-	K400A1D	—		
		28	SPST NO	Side Stable	None	28	Gasket	Continuous	-	K400A1F	6-1616945-7		
		28	SPST NO	Side Stable	1PST NO	28	Gasket	Cont. Econ.	42	K400A4C1	6-1616965-1		
		28	SPST NO	Side Stable	None	28	Gasket	Intermittent	-	K400B1D	8-1616968-4		
		28	SPST NO	Side Stable	None	28	Gasket	Continuous	-	K400B1F	2-1616921-3		
		28	SPST NO	Side Stable	2PDT	28	Gasket	Cont. Econ.	42	K400B3C05	7-1616941-3		
		28	SPST	Side Stable	3PDT	28	Gasket	Cont. Econ.	42	K4001B7C	4-1616959-8		
		28	SPST	Side Stable	3PDT	28	Gasket	Cont. Econ.	42	K4001A7C	6-1616970-7		
		28	SPST	Side Stable	1PDT	28	Gasket	Cont. Econ.	42	K4001B2C	6-1616970-8		
		28	SPST	Side Stable	1PDT	28	Gasket	Cont. Econ.	42	K4001A2C	6-1616970-6		
500	DC	28	SPST	Side Stable	None	28	Gasket	Continuous	-	K400A1F1	4-1616964-5		
		28	SPST NO	Side Stable	3PDT, 1PST NO, 1PST NC	28	Gasket	Cont. Econ.	42	K400B712C	5-1616946-6		
		28	SPST NO	Side Stable	1PDT	28	Gasket	Cont. Econ.	42	K500B2C	7-1616927-0		
		28	SPST NO	Side Stable	2PDT	28	Gasket	Cont. Econ.	42	K500B3C	7-1616970-0		
		28	SPST NO	Side Stable	2PDT	28	Gasket	Cont. Econ.	42	K500A3C	6-1616970-9		
		28	SPST NO	Side Stable	1PDT	28	Gasket	Cont. Econ.	42	K500A2C	4-1616951-4		
		28	SPST NO	Side Stable	3PDT	28	Gasket	Cont. Econ.	42	K500A7C01	2-1616970-8		
		28	SPST NO	Side Stable	3PDT	28	Gasket	Cont. Econ.	42	K500B7C01	9-1616965-0		
		1000	DC	28	SPST NO	Side Stable	N/A	28	Gasket	Continuous	-	K1000A1F03	4-1616966-1

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

**DH-14 and DH-21 Series, Rated up to 25 Amps, 28 Vdc**

**Product Facts**

- SPDT, 1 NO, 1 NC, Double Break
- Hermetically Sealed
- DH21 Series has magnetically latched contacts
- Meets many requirements of MIL-PRF-6106



**Performance Data**

**Electrical Characteristics**

- Contact Arrangement** — SPDT, 1 NO, 1 NC, Double Break
- Rated Operating Voltage** — 28 Vdc
- Resistive Rating** — 25 Amps
- Inductive Rating** — 25 Amps
- Motor Rating** — 15 Amps

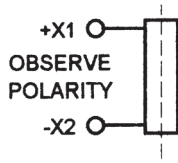
**General Characteristics**

- Temperature Range** — -55°C to +71°C
- Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles
- Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles
- Dielectric Strength** — All Circuits to Ground — 1,250 Vrms  
Circuit to Circuit — 1,250 Vrms  
Coil to Ground and Aux. Contacts — 1,000 Vrms
- Altitude Max.** — 80,000 ft.
- Weight** — .39 lbs

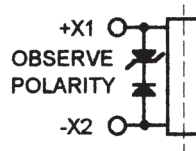
**Coil Characteristics**

- Duty Cycle** — Continuous (Type A, See diagram below), Continuous with suppression (Type B, See diagram below) or Intermittent (Type C)
- Operating Voltage, Nom.** — 28 Vdc
- Pickup Voltage @ 25°C, Max.** — 18 Vdc
- Dropout Voltage @ 25°C, Max.** — 1.0 to 7 Vdc

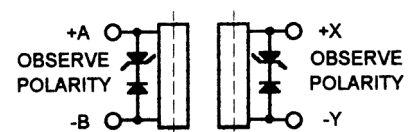
**Coil Type**



A — Continuous



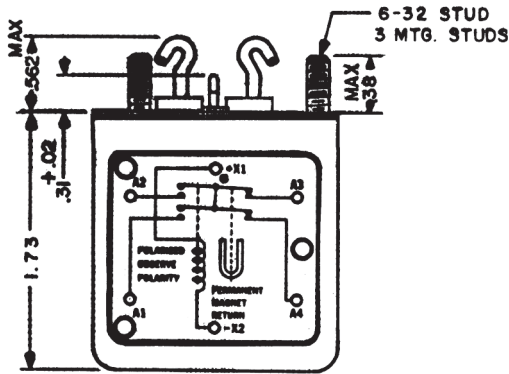
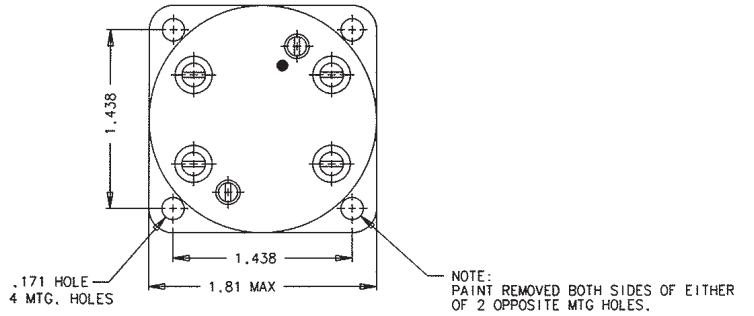
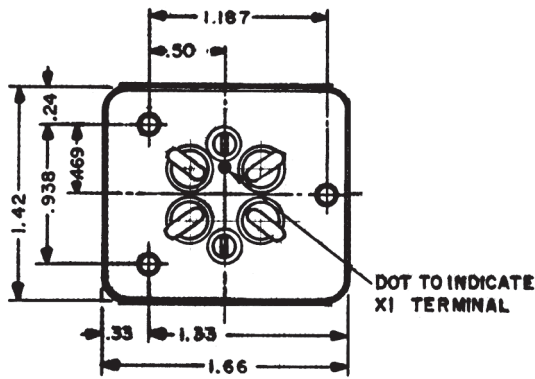
B — Continuous with Suppression



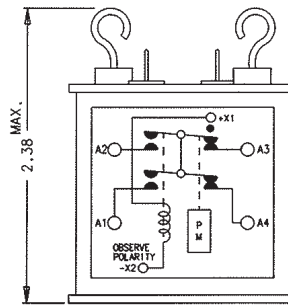
C — Intermittent

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

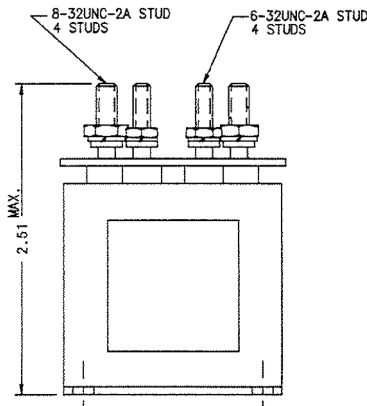
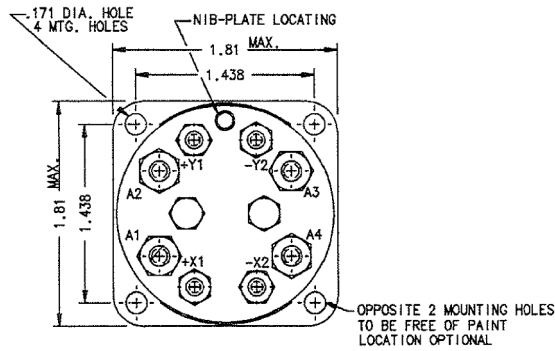
**DH-14 and DH-21 Series, Rated up to 25 Amps, 28 Vdc** (Continued)



Mounting Style A



Mounting Style B

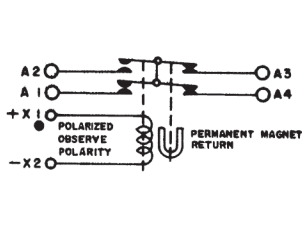


Mounting Style C

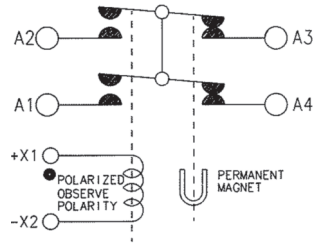
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

**DH-14 and DH-21 Series, Rated up to 25 Amps, 28 Vdc** (Continued)

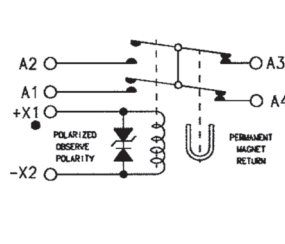
**Circuit Configurations** (Consult factory for other available circuit configurations)



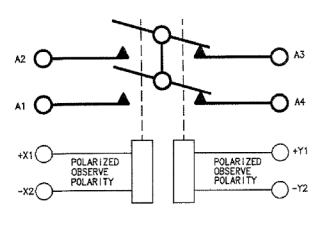
Circuit Configuration 1



Circuit Configuration 2



Circuit Configuration 3



Circuit Configuration 4

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
DH-14A	Hermetically Sealed	A	A	1	1616089-1
DH-14AL	Hermetically Sealed	B	A	2	1616089-2
DH-14AT	Hermetically Sealed	A	B	3	1616089-3
DH-21N*	Hermetically Sealed	C	C	4	1616026-2

\*DH21N is a magnetically latched unit. Contacts will remain in position until the opposing coil is pulsed.

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

**D-7, DH-7 and DH-18 Series, Rated up to 50 Amps, 28 Vdc**

**Product Facts**

- 2 SPST, 1 NO, 1 NC
- DH-18 Series are center-off double-throw units
- Gasket Sealed or Hermetically Sealed
- Auxiliary contacts available
- Meets many requirements of MIL-R-6106



**Performance Data**

**Electrical Characteristics**

**Contact Arrangement** — 2 SPST, 1 NO, 1 NC, Electrically Latched  
**Rated Operating Voltage** — 28 Vdc  
**Resistive Rating** — 50 Amps  
**Inductive Rating** — 25 Amps

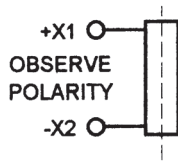
**General Characteristics**

**Temperature Range** — -55°C to +71°C  
**Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles  
**Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles  
**Dielectric Strength** — All Circuits to Ground — 1,500 Vrms  
 Circuit to Circuit — 1,500 Vrms  
 Coil to Ground and Aux. Contacts — 1,000 Vrms  
**Altitude Max.** — 50,000 ft.  
**Weight** — .72 to .94 lbs

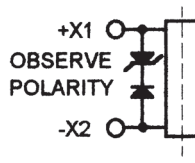
**Coil Characteristics**

**Duty Cycle** — Continuous (Type A, See diagram below) or Continuous with suppression (Type B, See diagram below) or Continuous (Type C)  
**Operating Voltage, Nom.** — 28 Vdc  
**Pickup Voltage @ 25°C, Max.** — 18 Vdc  
**Dropout Voltage @ 25°C, Max.** — 1.5 to 7 Vdc  
**Coil Current @ 25°C, Max.** — 0.28 Amp

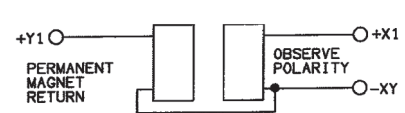
**Coil Type**



A — Continuous



B — Continuous with Suppression

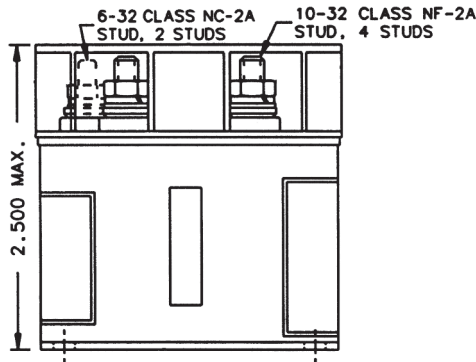
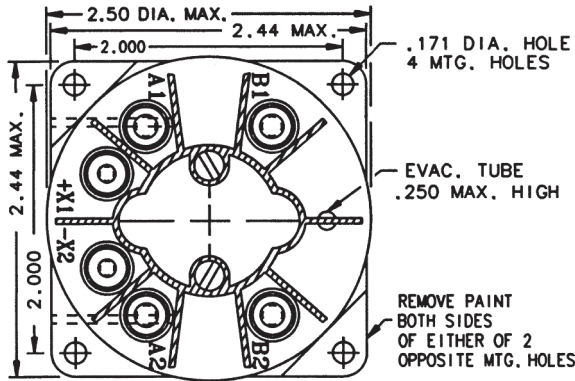


C — Continuous

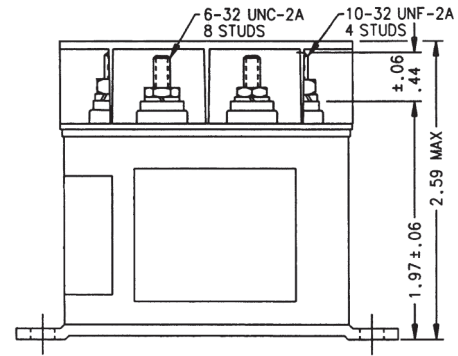
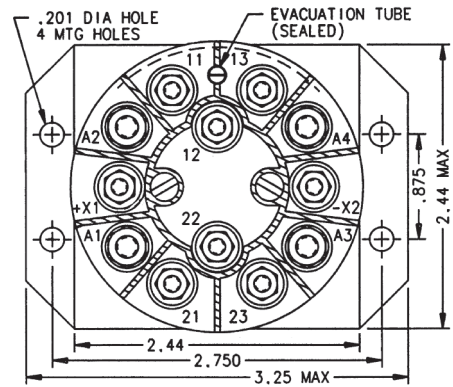
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.



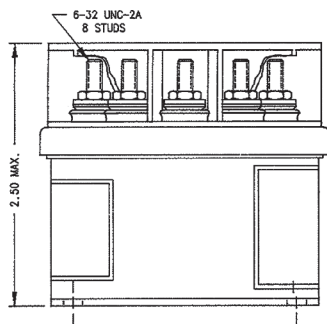
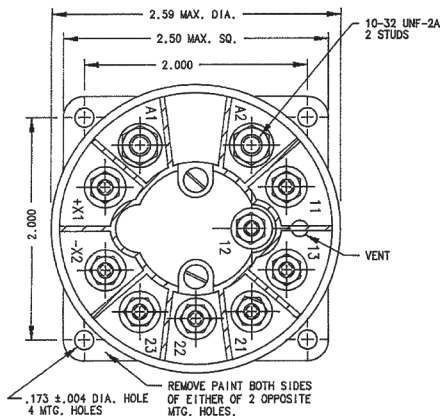
**D-7, DH-7 and DH-18 Series, Rated up to 50 Amps, 28 Vdc** (Continued)



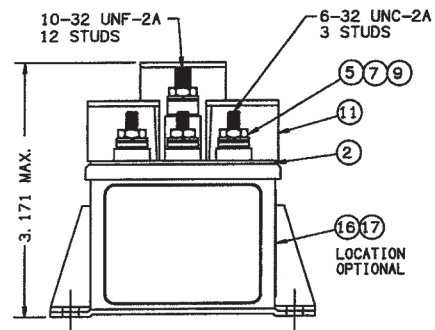
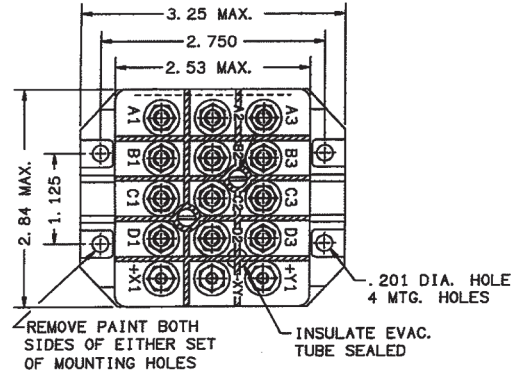
Mounting Style A



Mounting Style B



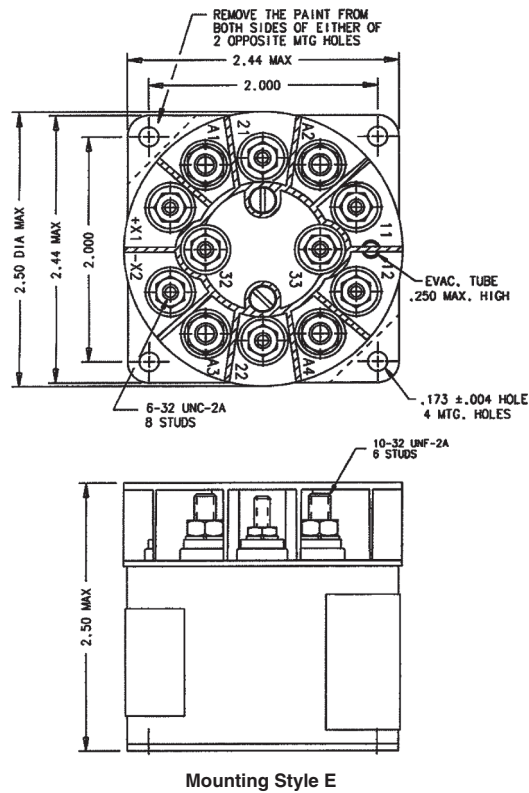
Mounting Style C



Mounting Style D

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

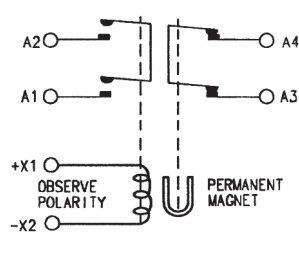
**D-7, DH-7 and DH-18 Series, Rated up to 50 Amps, 28 Vdc** (Continued)



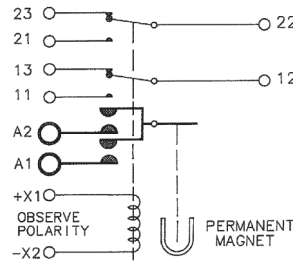
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

**D-7, DH-7 and DH-18 Series, Rated up to 50 Amps, 28 Vdc** (Continued)

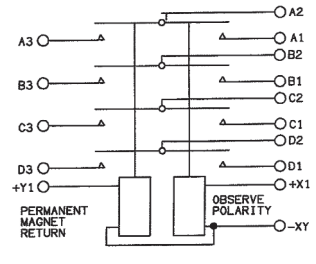
**Circuit Configurations** (Consult factory for other available circuit configurations)



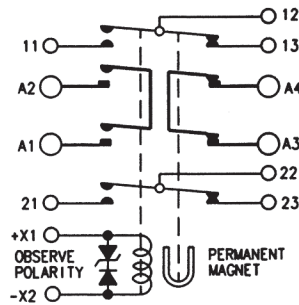
Circuit Configuration 1



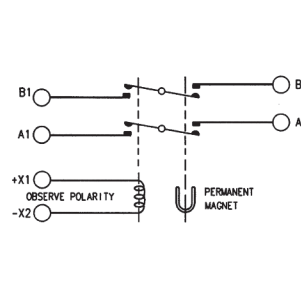
Circuit Configuration 2



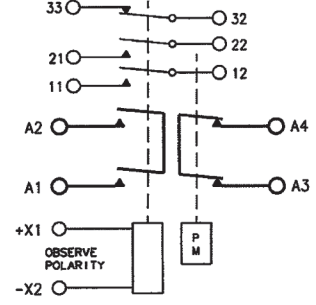
Circuit Configuration 3



Circuit Configuration 4



Circuit Configuration 5



Circuit Configuration 6

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
D-7AC	Gasket Sealed	A	A	1	1616088-1
D-7LHB	Gasket Sealed	C	A	2	1616064-1
DH-18DA*	Hermetically Sealed	D	C	3	1616050-2
DH-7ATK	Hermetically Sealed	B	B	4	1616089-7
DH-7MN	Hermetically Sealed	A	A	5	1616103-2
DH-7TB	Hermetically Sealed	E	A	6	1-1616089-3

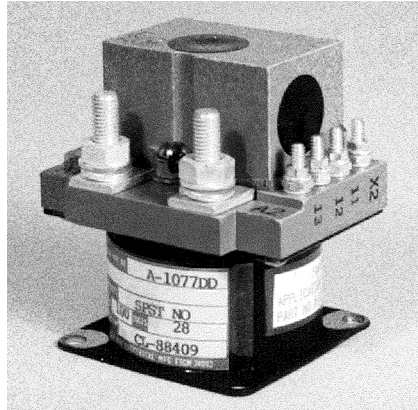
\*DH-18DA is a 4PDT center-off unit. Contacts will return to the center position when coil power is removed.

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

## A-1077 Series, Rated up to 100 Amps, 28 Vdc

### Product Facts

- SPST NO, Double Break or SPDT Double Break
- Gasket Sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

##### Main Contact Configuration —

A-1077DD — SPST NO

A-1077S — SPDT

**Rated Operating Voltage** —  
28 Vdc

**Main Contact Rating** —

**Resistive Rating** — 100 Amps

**Inductive Rating** — 100 Amps

**Motor Rating** — 100 Amps

**Interrupt Rating** — 1,200 Amps

**Auxiliary Contacts** —

**Resistive Rating** —  
5 Amp, 28 VAC/115 VAC

### General Characteristics

**Temperature Range** —  
-55°C to +71°C

**Operating Cycles (Life) at Rated Resistive Load, Min.** —  
50,000 cycles

**Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles

**Dielectric Strength** —  
All Circuits to Ground — 1,250 Vrms  
Circuit to Circuit — 1,250 Vrms  
Coil to Ground and Aux. Contacts —  
1,000 Vrms

**Altitude, Max.** — 50,000 ft.

**Weight, Max.** — 1.5 to 2 lbs

### Coil Characteristics

#### Coil Characteristics

**Duty Cycle** — Continuous

**Operating Voltage, Max.** — 32 Vdc

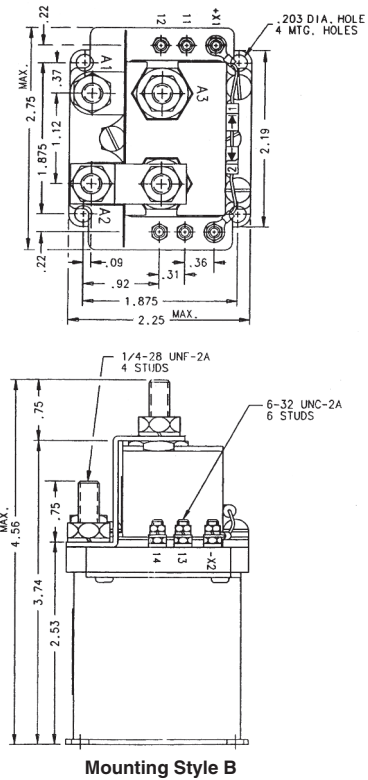
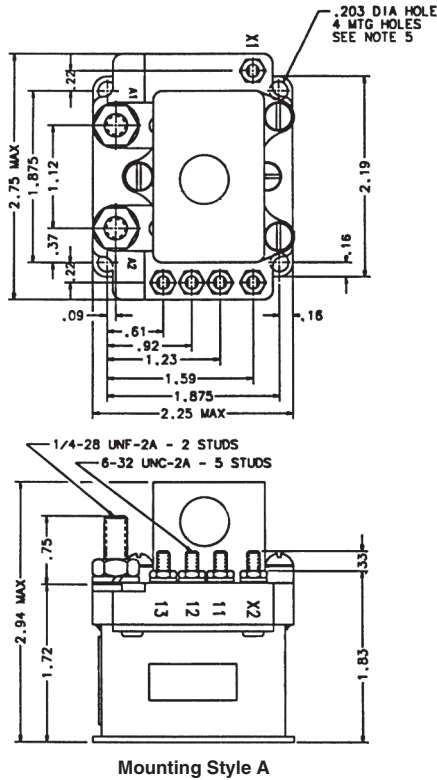
**Operating Voltage, Min.** — 24 Vdc

**Pickup Voltage @ 25°C, Max.** —  
16.5 Vdc

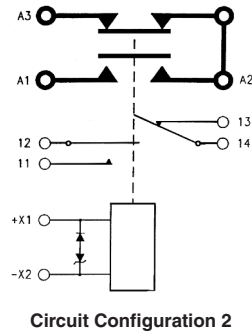
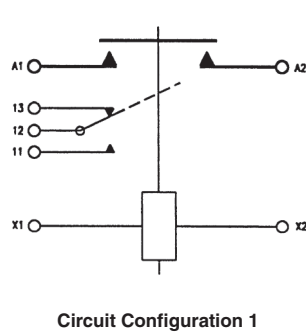
**Dropout Voltage** — 1 to 7 Vdc

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

**A-1077 Series, Rated up to 100 Amps, 28 Vdc (Continued)**



**Circuit Configurations (Consult factory for other available circuit configurations)**



HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
A-1077DD	Gasket Sealed	A	Continuous	1	1616055-3
A-1077S	Gasket Sealed	B	Continuous, w/ Suppression	2	1616081-3

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

## D-31 Series, Rated up to 100 Amps, 28 Vdc

### Product Facts

- SPDT, Center Off, Double Break
- Gasket Sealed, Vented
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

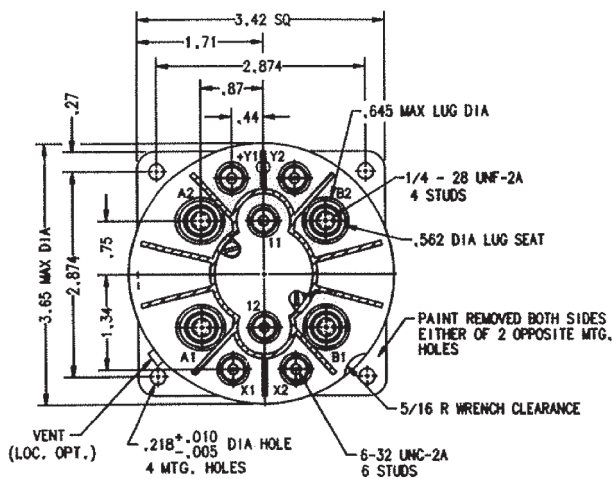
- Main Contacts —**  
**Main Contact Configuration —** SPDT, Center Off, Double Break  
**Voltage, Nom. —** 28 Vdc  
**Resistive Rating —** 100 Amps  
**Inductive Rating —** 100 Amps  
**Motor Rating —** 80 Amps  
**Overload Rating —** 800 Amps  
**Rupture Rating —** 1,000 Amps  
**Auxiliary Contacts —**  
**Aux. Contact Configuration —** SPST, NO  
**Voltage, Nom. —** 115 VAC, 400 Hz or 28 Vdc  
**Resistive Rating —** 3 Amp  
**Inductive Rating —** 3 Amp  
**Lamp Rating —** 1 Amp

#### General Characteristics

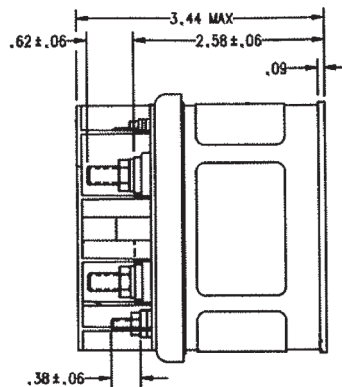
- Temperature Range —** -55°C to +71°C  
**Operating Cycles (Life) at Rated Resistive Load, Min. —** 50,000 cycles  
**Operating Cycles (Life) Mechanical, Min. —** 100,000 cycles  
**Altitude —** 50,000 ft.  
**Weight, Max. —** 1 lb 15 oz

#### Coil Characteristics

- Duty Cycle —** Continuous  
**Coil Data, X Coil —**  
**Operating Voltage, Nominal —** 115 VAC, 400 Hz  
**Pickup Voltage @ 25°C, Max., Initial —** 75 VAC, 400 Hz  
**Dropout Voltage @ 25°C —** 12 V to 38 V  
**Coil Resistance ±20% @ 25°C —** 655 Ohms  
**Coil Current @ 25°C —** .050 Amp DC AV @ 115 VAC, 400 Hz  
**Coil Data, Y Coil —**  
**Operating Voltage, Nominal —** 28 Vdc  
**Pickup Voltage @ 25°C, Max., Initial —** 15 VDC  
**Dropout Voltage @ 25°C —** 2.0 V to 6.5 V  
**Coil Resistance ±20% @ 25°C —** 163 Ohms  
**Coil Current @ 25°C —** .215 Amp Max. @ 28 Vdc

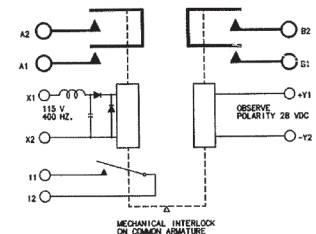


Mounting Style A



### Circuit Configurations

(Consult factory for other available circuit configurations)



Circuit Configuration 1

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

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
D-31BAA	Gasket/Vented	A	Continuous	1	1616097-1

## D-32A Series, Rated up to 100 Amps, 28 Vdc

### Product Facts

- 2PST, Center Off, Double Break
- Gasket Sealed, Vented
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

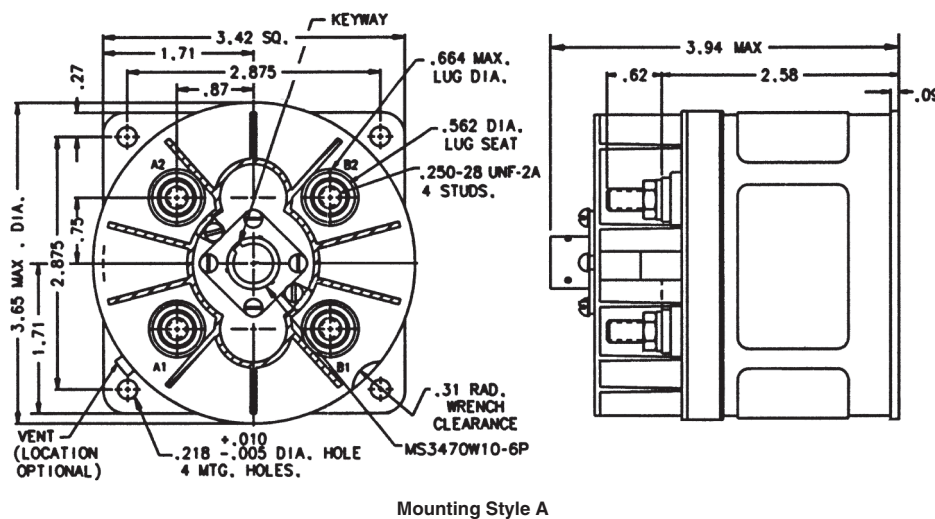
**Main Contacts —**  
**Main Contact Configuration —** 2PST, Center Off  
**Voltage, Nom. —** 28 Vdc  
**Resistive Rating —** 100 Amps  
**Inductive Rating —** 100 Amps  
**Motor Rating —** 80 Amps  
**Lamp Rating —** 50 Amps  
**Overload Rating —** 800 Amps  
**Rupture Rating —** 1,000 Amps  
**Auxiliary Contacts —**  
**Aux. Contact Configuration —** SPST  
**Voltage, Nom. —** 28 Vdc  
**Resistive Rating —** 0.1 Amps  
**Inductive Rating —** 0.1 Amps  
**Lamp Rating —** 0.1 Amps

#### General Characteristics

**Temperature Range —** -55°C to +71°C  
**Operating Cycles (Life) at Rated Resistive Load, Min. —** 50,000 cycles  
**Operating Cycles (Life) Mechanical, Min. —** 100,000 cycles  
**Dielectric Strength —**  
 All Circuits to Ground — 1,250 Vrms  
 Circuit to Circuit — 1,250 Vrms  
 Coil to Ground and Aux. Contacts — 1,000 Vrms  
**Altitude —** 50,000 ft.  
**Weight, Max. —** 1.9 lbs

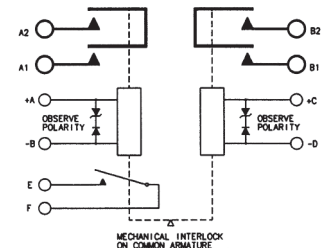
#### Coil Characteristics

**Duty Cycle —** Continuous with suppression  
**Operating Voltage, Nom. —** 28 Vdc  
**Operating Voltage, Max. —** 30 Vdc  
**Pickup Voltage, Max. —** 18 Vdc  
**Dropout Voltage, Max. —** 1.5 to 7.5 Vdc  
**Hold Voltage —** 8.0 Vdc  
**Coil Resistance ±10% @ 77°F —** 163 Ohms  
**Coil Current @ 77°F & 30 Vdc, Max. —** 0.215 Amp



### Circuit Configurations

(Consult factory for other available circuit configurations)



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

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
D-32A	Gasket/Vented	A	Continuous w/ Suppression	1	1616097-2

## DH-25 Series, Rated up to 100 Amps, 28 Vdc

### Product Facts

- SPDT, 1 NO, 1 NC, Double Break
- Gasket Sealed or Hermetically Sealed
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

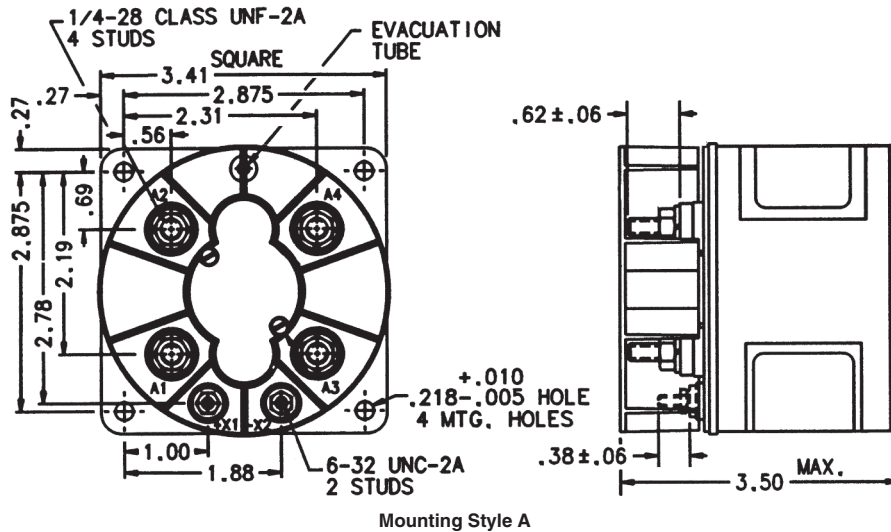
- Contact Arrangement** — SPDT, 1 NO, 1 NC, Double Break
- Rated Operating Voltage** — 28 Vdc
- Resistive Rating** — 100 Amps
- Inductive Rating** — 100 Amps
- Motor Rating** — 60 Amps
- Interrupt Rating** — 600 Amps

#### General Characteristics

- Temperature Range** — -55°C to +85°C
- Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles
- Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles
- Dielectric Strength** — All Circuits to Ground — 1,250 Vrms  
Circuit to Circuit — 1,250 Vrms  
Coil to Ground and Aux. Contacts — 1,000 Vrms
- Altitude Max.** — 80,000 ft.
- Weight** — 1.81 lbs

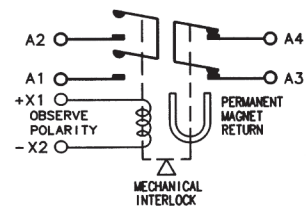
#### Coil Characteristics

- Duty Cycle** — Continuous
- Operating Voltage, Max.** — 32 Vdc
- Operating Voltage @ 21°C, Min.** — 18 Vdc
- Dropout Voltage @ 25°C, Max.** — 1.0 to 7 Vdc
- Coil Resistance ±20% @ 25°C** — 180 Ohms



### Circuit Configurations

(Consult factory for other available circuit configurations)



Circuit Configuration 1

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
DH-25EA	Hermetically Sealed	A	Continuous	1	1616089-4

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



**DHR-31BA Series, Rated up to 100 Amps, 28 Vdc**

**Product Facts**

- SPDT, Center Off
- Hermetically Sealed



**Performance Data**

**Electrical Characteristics**

- Main Contacts** —
- Main Contact Arrangement** — SPDT, Center Off
- Rated Operating Voltage** — 28 Vdc
- Resistive Rating** — 100 Amps
- Inductive Rating** — 100 Amps
- Motor Rating** — 100 Amps
- Inrush, Max.** — 500 Amps
- Auxiliary Contacts** —

**Aux. Contact Configuration** — SPST, NO

**Resistive Rating** — 5 Amp

**Inductive Rating** — 5 Amp

**General Characteristics**

**Temperature Range** — -55°C to +120°C

**Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles

**Weight** — 1 lb 13 oz

**Coil Characteristics**

**Duty Cycle** — Continuous

**Operating Voltage, Nom.** —

Coil X1-X2 (120 V, 400 Hz) —

Pickup 100 V Max. Hot

Dropout 25 V ± 20 V

Nom. Resistance 1050 Ohms ± 10%

Coil Y1-Y2 (28 Vdc) —

Pickup 20 Vdc Max. Hot

Dropout 1.5 to 7 Vdc

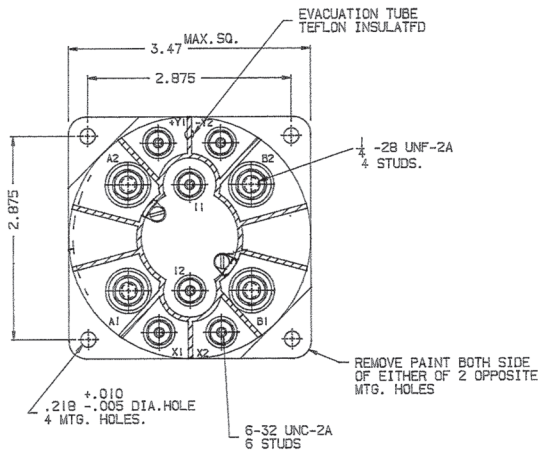
Nom. Resistance 163 Ohms ± 10%

**Coil Current @ Nom. 120 V** —

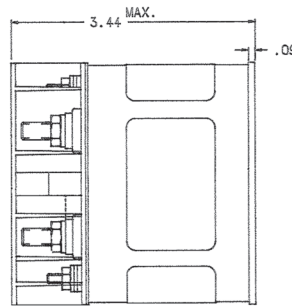
X1-X2 — 0.12 Amp at 25°C

**Coil Current @ Nom. 28 Vdc** —

Y1-Y2 — 0.19 Amp at 25°C

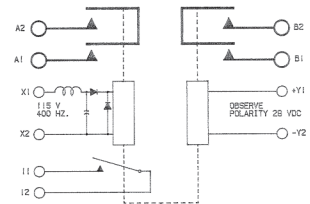


**Mounting Style A**



**Circuit Configurations**

(Consult factory for other available circuit configurations)



**Circuit Configuration 1**

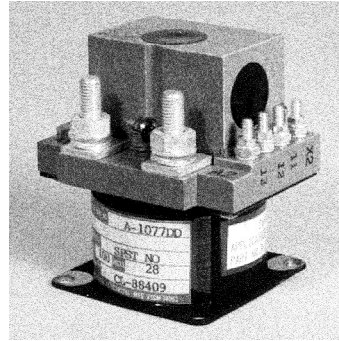
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
DHR-31BA	Hermetically Sealed	A	Continuous	1	1616098-1

## A1077 Series, Rated up to 200 Amps, 28 Vdc

### Product Facts

- SPST NO, Double Break or SPDT Double Break
- Gasket Sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



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

### Performance Data

#### Electrical Characteristics

**Contact Arrangement** — SPST NO, Double Break or SPDT Double Break

**Rated Operating Voltage** — 28 Vdc

**Resistive Rating** — 200 Amps  
**Inrush Rating** — 800 Amps

#### General Characteristics

**Temperature Range** — -55°C to +71°C

**Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles

**Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles

**Dielectric Strength** — All Circuits to Ground — 1,250 Vrms  
Circuit to Circuit — 1,250 Vrms  
Coil to Ground and Aux. Contacts — 1,000 Vrms

**Weight** — 1.50 to 1.90 lbs

#### Coil Characteristics

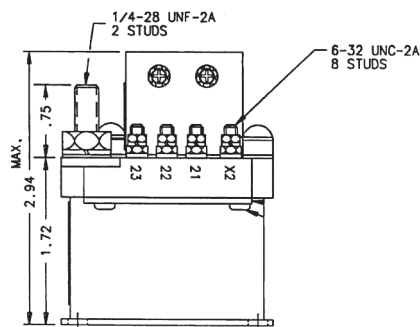
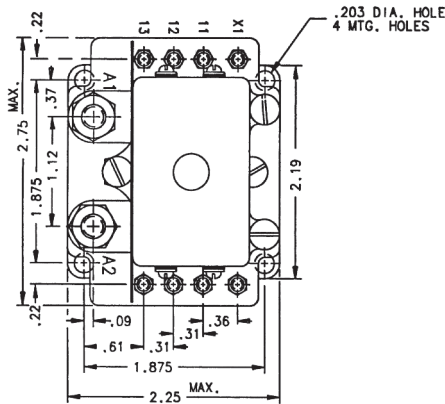
**Duty Cycle** — Continuous

**Operating Voltage, Max.** — 32 Vdc

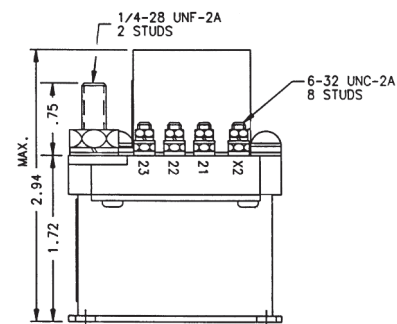
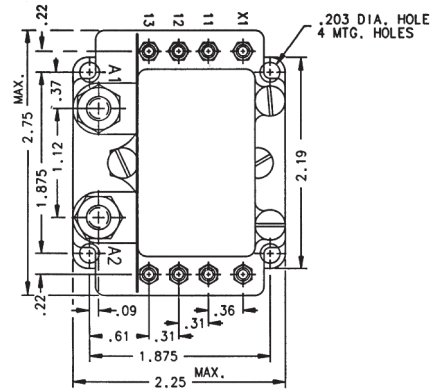
**Operating Voltage, Nom.** — 24 Vdc

**Pickup Voltage @ 25°C, Max.** — 16.5 Vdc

**Dropout Voltage** — 1.0 to 7 Vdc



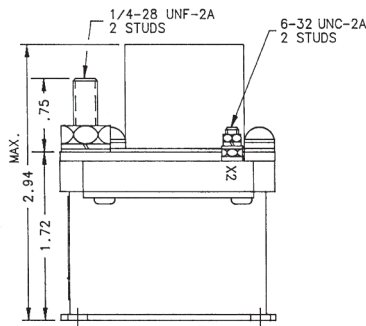
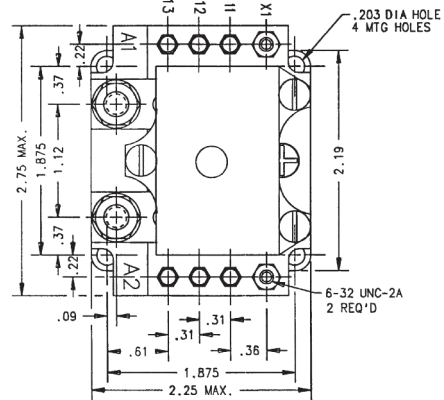
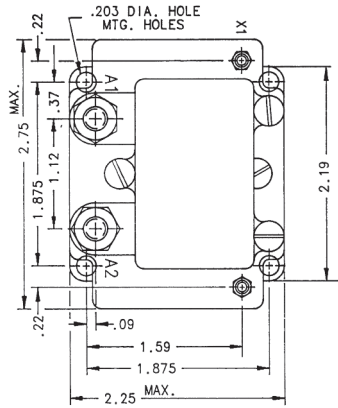
Mounting Style A



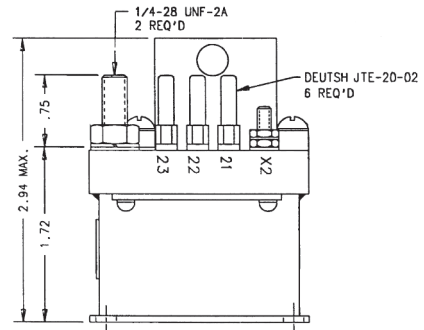
Mounting Style B

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

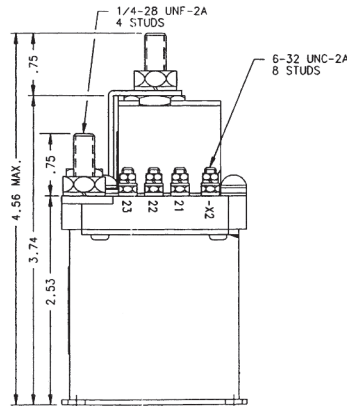
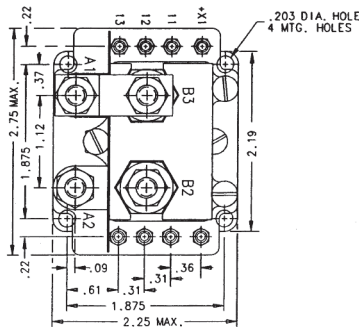
**A1077 Series, Rated up to 200 Amps, 28 Vdc** (Continued)



**Mounting Style C**



**Mounting Style D**

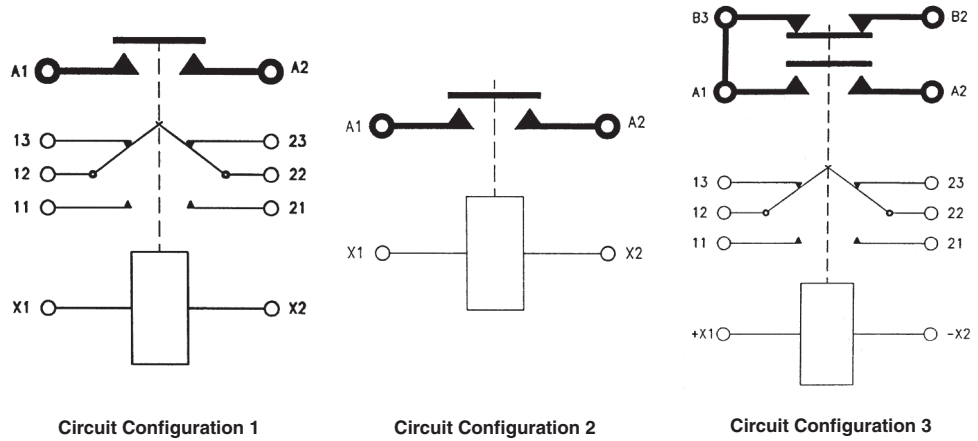


**Mounting Style E**

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

**A1077 Series, Rated up to 200 Amps, 28 Vdc** (Continued)

**Circuit Configurations** (Consult factory for other available circuit configurations)



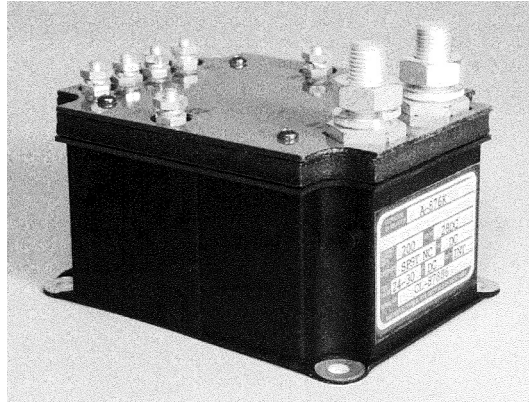
HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
A-1077D	Gasket Sealed	A	Intermittent	1	1616055-2
A-1077F	Gasket Sealed	B	Continuous	1	1616055-4
A-1077G	Gasket Sealed	C	Continuous	2	1616055-5
A-1077V	Gasket Sealed	D	Continuous	1	1616055-6
A-1077W	Gasket Sealed	E	Continuous	3	1616081-4

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

## A876 Series, Rated up to 200 Amps, 28 Vdc

### Product Facts

- SPST NC, Double Break
- Gasket Sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

**Main Contacts** —

**Main Contact Configuration** — SPST NC, Double Break

**Rated Operating Voltage** — 28 Vdc

**Resistive Rating** — 200 Amps

**Inrush, Carry Only** — 900 Amps

**Auxiliary Contacts** —

**Aux. Contact Configuration** — DPST NO

**Voltage, Nom.** — 28 Vdc

**Resistive Rating** — 5 Amps

#### General Characteristics

**Temperature Range** —

-55°C to +71°C

**Operating Cycles (Life) at Rated**

**Resistive Load, Min.** — 50,000 cycles

**Operating Cycles (Life)**

**Mechanical, Min.** — 100,000 cycles

**Dielectric Strength** —

All Circuits to Ground — 1,250 Vrms

Circuit to Circuit — 1,250 Vrms

Coil to Ground and Aux. Contacts —

1,000 Vrms

**Weight** — 3.00 lbs

#### Coil Characteristics

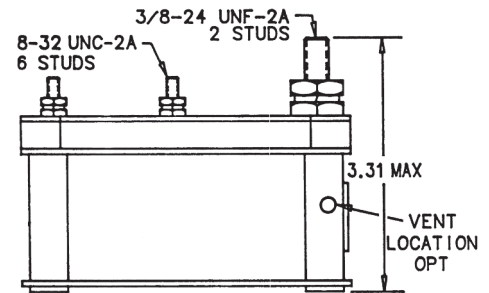
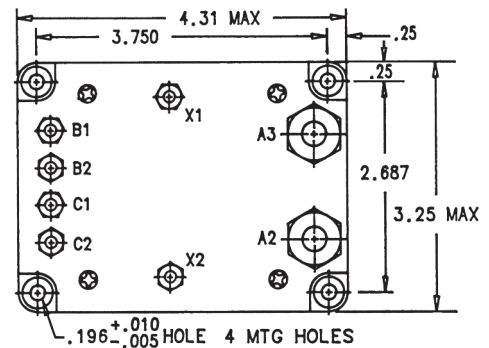
**Duty Cycle** — Intermittent

**Operating Voltage** — 24 to 30 Vdc

**Pickup Voltage, Max.** — 18 Vdc

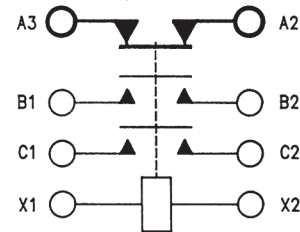
**Dropout Voltage** — 1 to 7 Vdc

**Coil Resistance ± 20% @ 25°C** — 19.7 Ohms



Mounting Style A

**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1

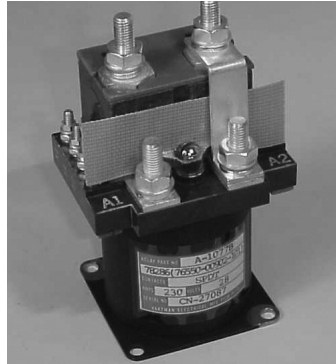
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
A-876K	Gasket/Vented	A	Intermittent	1	1616059-1

**A1077 Series, Rated up to 230 Amps, 28 Vdc**

**Product Facts**

- Gasket Sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



**Performance Data**

**Electrical Characteristics**

**Contact Arrangement** — SPST NO, Double Break or SPDT Double Break

**Rated Operating Voltage** — 28 Vdc

**Resistive Rating** — 230 Amps

**Inrush Rating** — 600 Amps

**General Characteristics**

**Temperature Range** — -55°C to +71°C

**Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles

**Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles

**Dielectric Strength** — All Circuits to Ground — 1,250 Vrms  
Circuit to Circuit — 1,250 Vrms  
Coil to Ground and Aux. Contacts — 1,000 Vrms

**Weight** — 1.90 lbs

**Coil Characteristics**

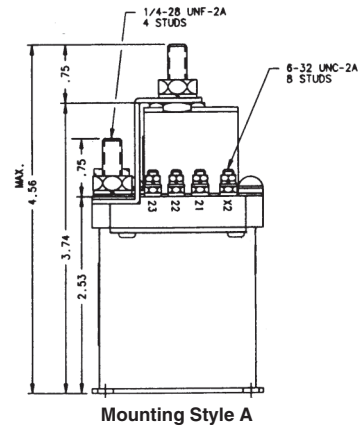
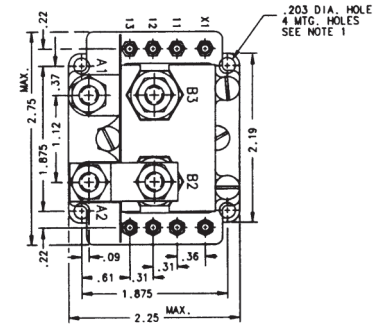
**Duty Cycle** — Continuous

**Operating Voltage, Max.** — 30 Vdc

**Operating Voltage, Nom.** — 24 Vdc

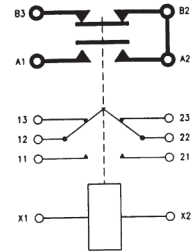
**Pickup Voltage @ 25°C, Max.** — 16.5 Vdc

**Dropout Voltage** — 0.5 to 7 Vdc



**Mounting Style A**

**Circuit Configurations** (Consult factory for other available circuit configurations)



**Circuit Configuration 1**

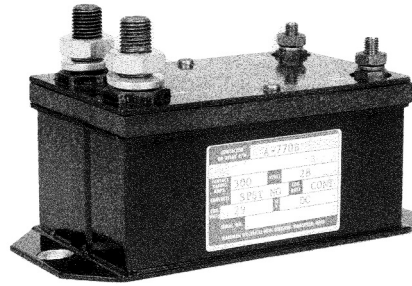
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
A-1077B	Gasket Sealed	A	Continuous	1	1616081-1

**A-770 and AR-770 Series, Rated up to 300 Amps, 28 Vdc**

**Product Facts**

- SPST NO, Double Break
- Gasket Sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



**Performance Data**

**Electrical Characteristics**

- Contact Arrangement** — SPST NO, Double Break
- Rated Operating Voltage** — 28 Vdc
- Resistive Rating** — 300 Amps
- Motor Load** — 300 Amps
- Rupture Rating** — 3,000 Amps

**General Characteristics**

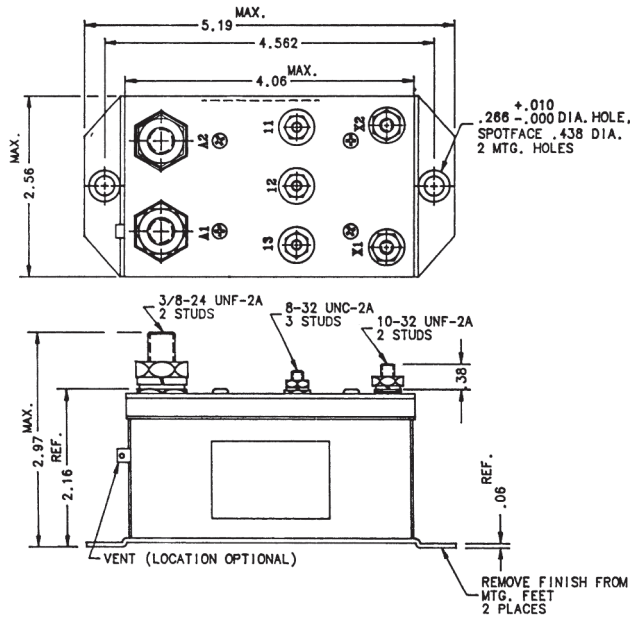
- Temperature Range** — -55°C to +71°C
- Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles
- Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles
- Dielectric Strength** — All Circuits to Ground — 1,250 Vrms  
Circuit to Circuit — 1,250 Vrms  
Coil to Ground and Aux. Contacts — 1,000 Vrms
- Altitude Max.** — 50,000 ft.
- Weight** — 2.00 lbs

**Coil Characteristics**

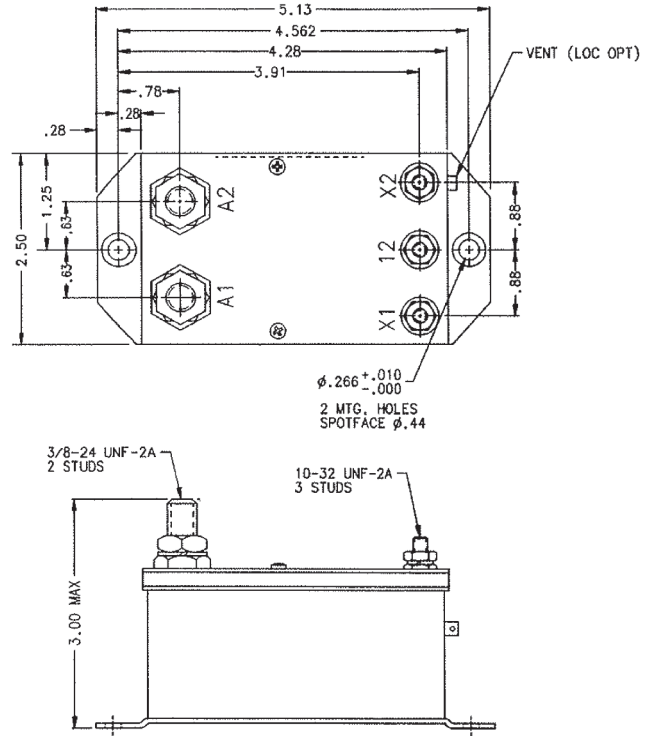
- Duty Cycle** — DC Continuous or Intermittent or Continuous or Intermittent with suppression
- Operating Voltage, Nom.** — 28 Vdc
- Pickup Voltage @ 25°C, Max.** — 16 Vdc
- Dropout Voltage @ 25°C** — 1.5 to 5 Vdc
- Coil Current, Max., Holding** — Coil Type A — 0.4 Amp  
Coil Type B — 0.625 Amp

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

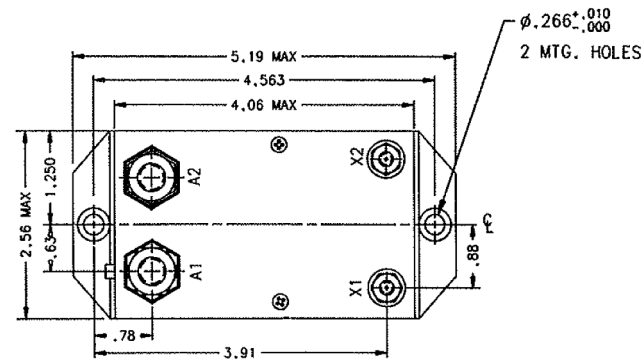
**A-770 and AR-770 Series, Rated up to 300 Amps, 28 Vdc** (Continued)



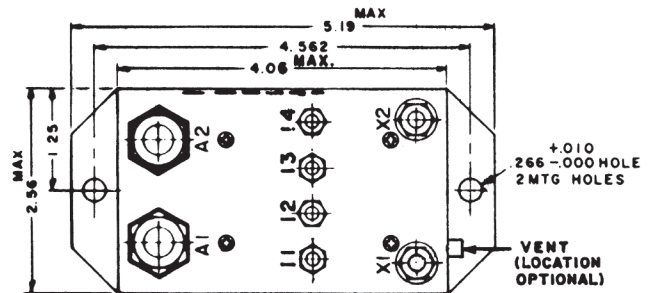
Mounting Style A



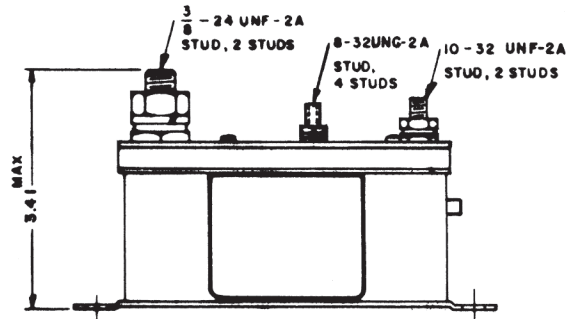
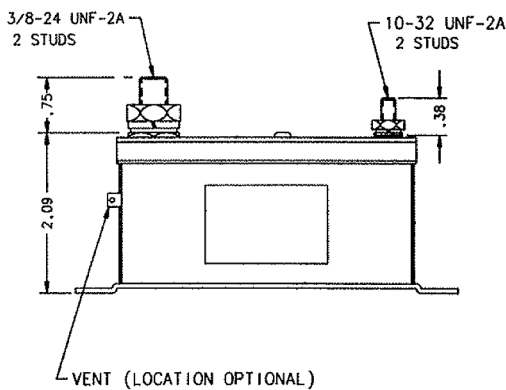
Mounting Style B



Mounting Style C



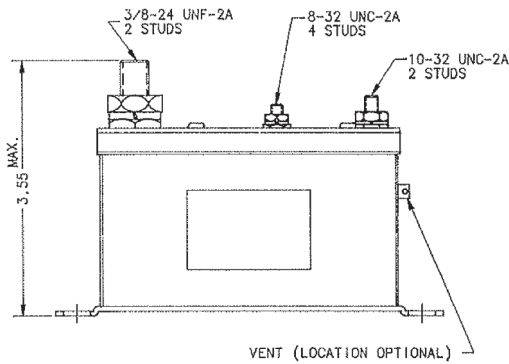
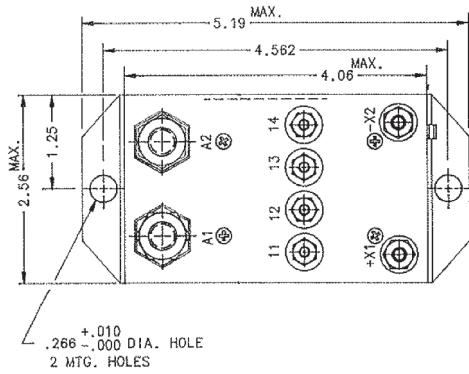
Mounting Style D



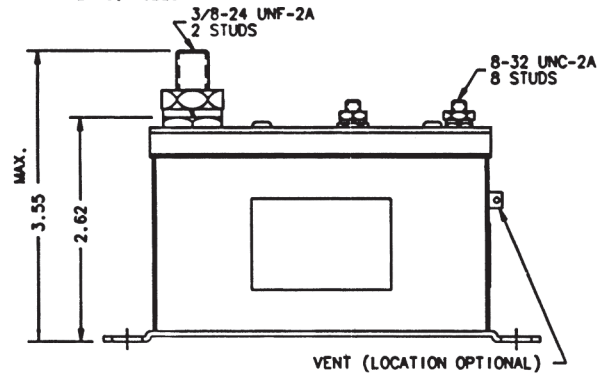
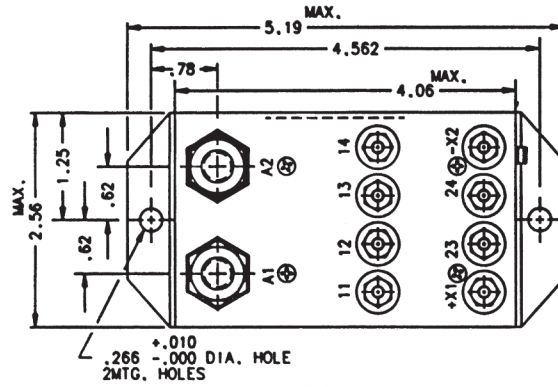
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.



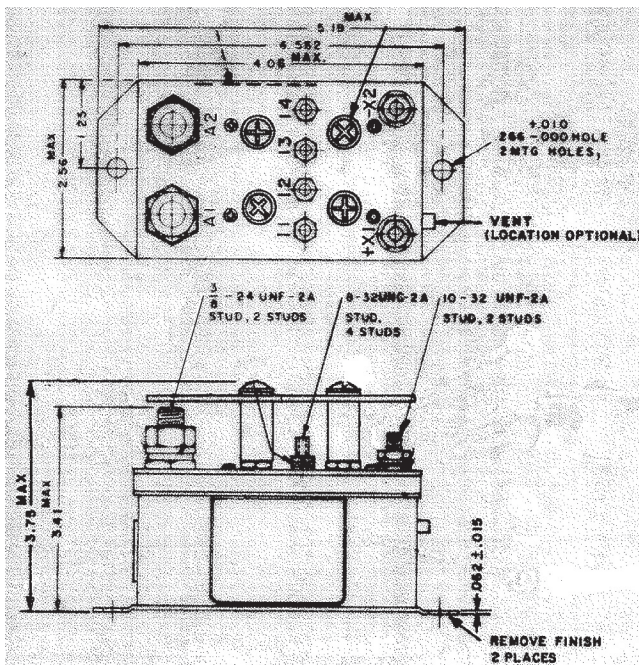
**A-770 and AR-770 Series, Rated up to 300 Amps, 28 Vdc** (Continued)



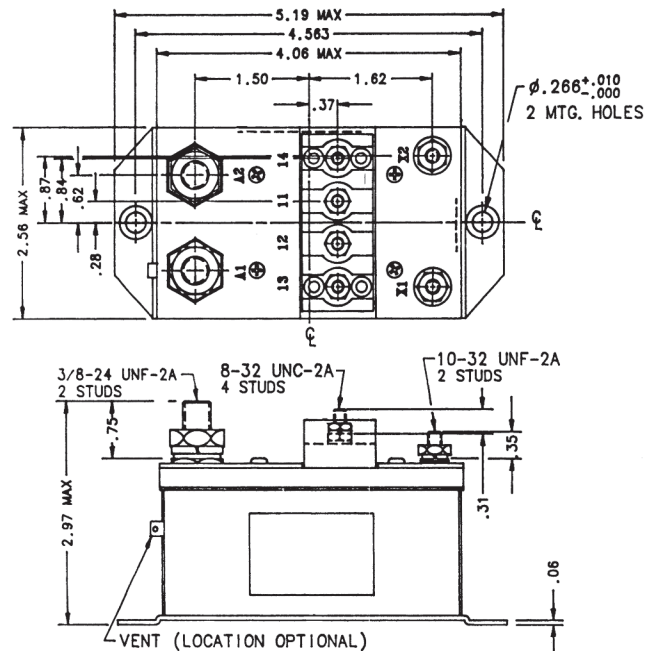
Mounting Style E



Mounting Style F



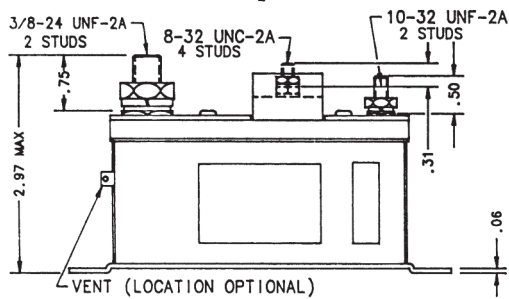
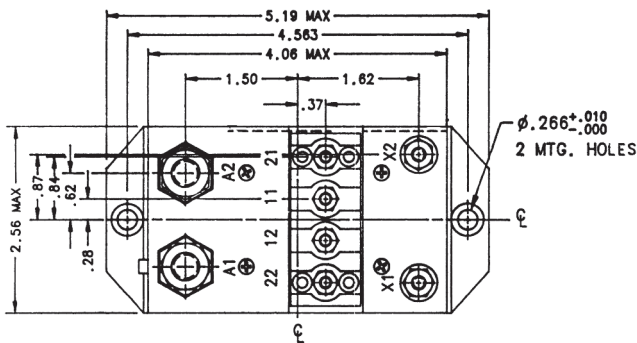
Mounting Style G



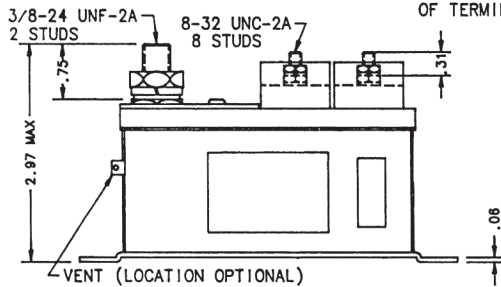
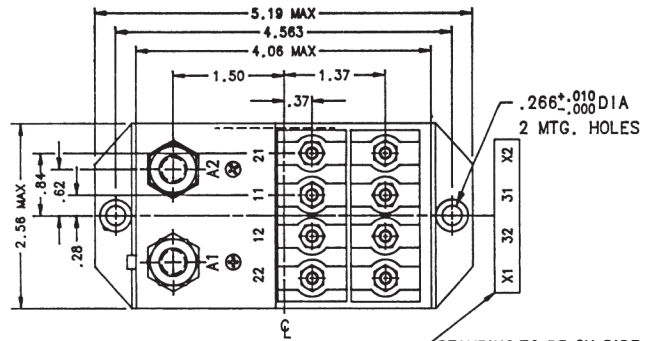
Mounting Style H

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

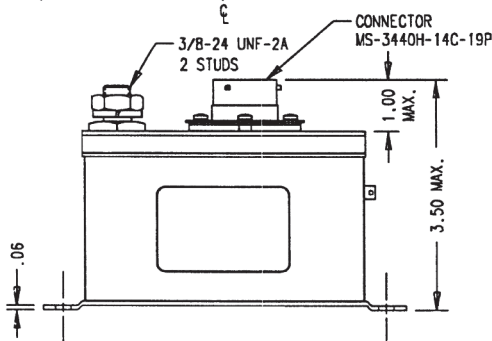
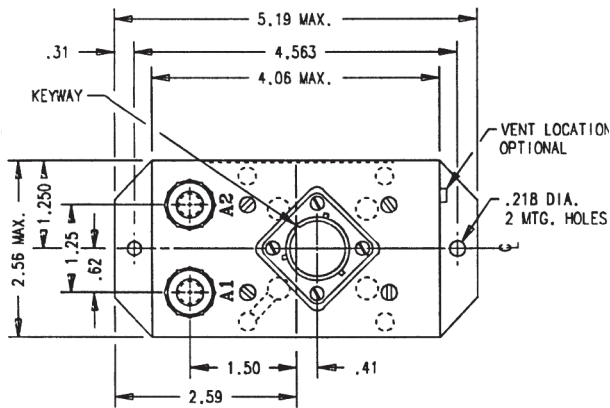
**A-770 and AR-770 Series, Rated up to 300 Amps, 28 Vdc (Continued)**



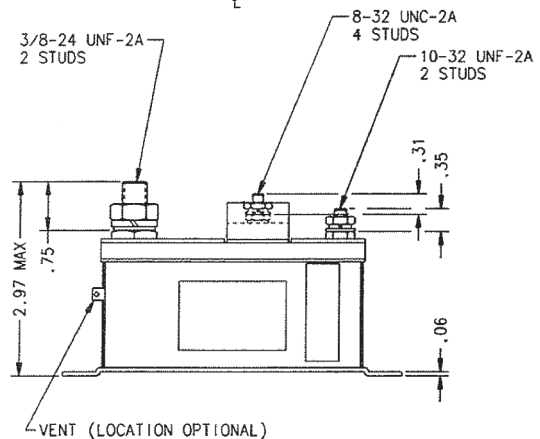
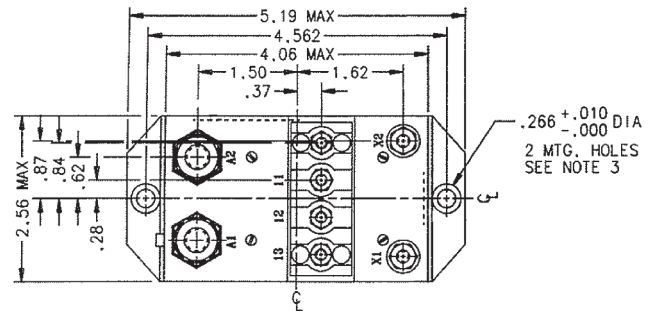
Mounting Style I



Mounting Style J



Mounting Style K

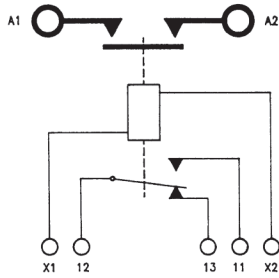


Mounting Style L

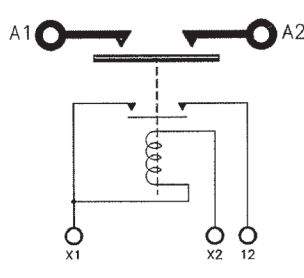
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

**A-770 and AR-770 Series, Rated up to 300 Amps, 28 Vdc** (Continued)

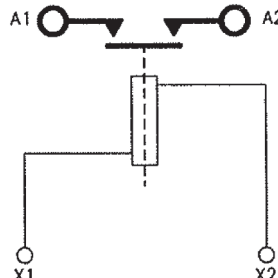
**Circuit Configurations** (Consult factory for other available circuit configurations)



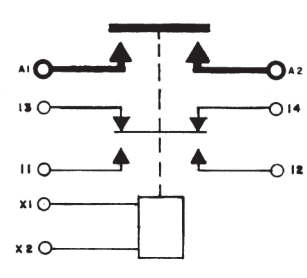
**Circuit Configuration 1**



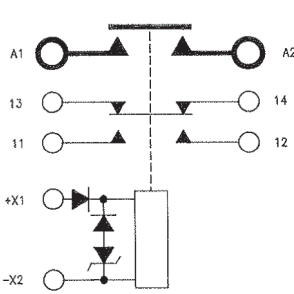
**Circuit Configuration 2**



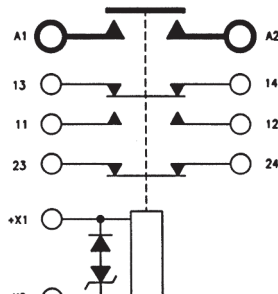
**Circuit Configuration 3**



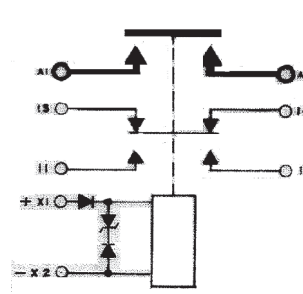
**Circuit Configuration 4**



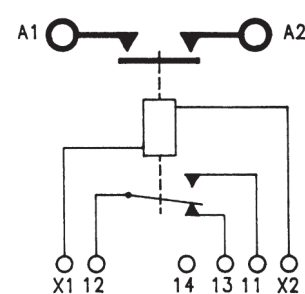
**Circuit Configuration 5**



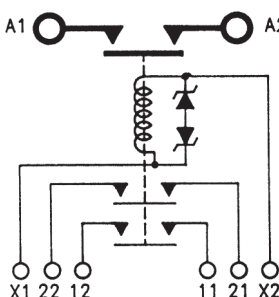
**Circuit Configuration 6**



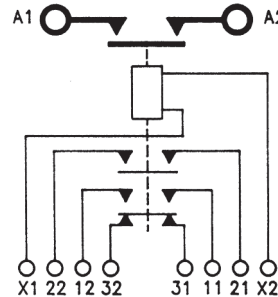
**Circuit Configuration 7**



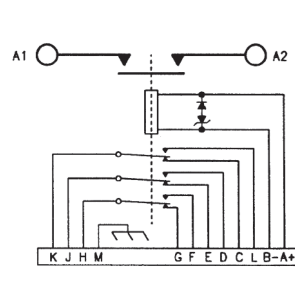
**Circuit Configuration 8**



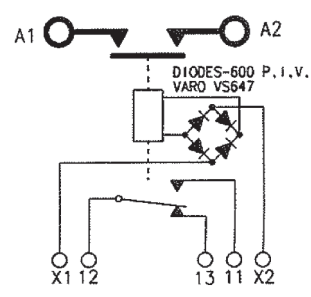
**Circuit Configuration 9**



**Circuit Configuration 10**



**Circuit Configuration 11**



**Circuit Configuration 12**

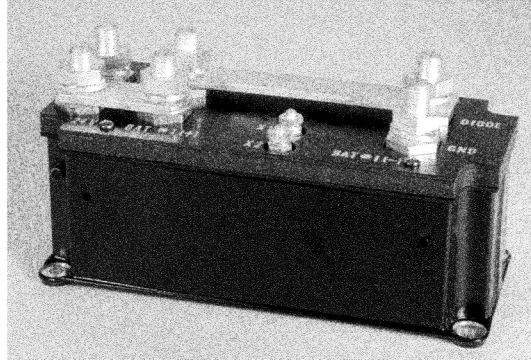
HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
A-770AM	Gasket/Vented	A	Continuous	1	3-1616058-1
A-770N	Gasket/Vented	B	Continuous	2	3-1616058-3
A-770RF	Gasket/Vented	C	Continuous	3	3-1616058-4
A-770RG	Gasket/Vented	D	Intermittent	4	3-1616058-5
A-770RN	Gasket/Vented	E	Continuous w/Supp.	5	3-1616058-8
A-770RSS	Gasket/Vented	F	Continuous w/Supp.	6	3-1616058-9
A-770RV	Gasket/Vented	G	Intermittent w/Supp.	7	1616530-7
A-770W	Gasket/Vented	H	Continuous	8	4-1616058-1
A-770WA-2	Gasket/Vented	I	Intermittent	9	4-1616058-2
A-770WA-3	Gasket/Vented	J	Intermittent	10	4-1616058-3
A-770WF	Gasket/Vented	K	Continuous	11	4-1616058-4
AR-770W	Gasket/Vented	L	Continuous	12	1616063-1

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

## A-848 Series, Rated up to 300 Amps, 24/48 Vdc

### Product Facts

- SPST NO, DPST NC, Double break
- Gasket sealed
- Meets many requirements of MIL-PRF-6106
- Designed for series/parallel starting systems



### Performance Data

#### Electrical Characteristics

**Contact Arrangement** — SPST NO, DPST NC, Double Break

**Rated Operating Voltage** — 24/48 Vdc

**Resistive Rating** — 300 Amps

**Inrush for 30 sec** — 1,100 Amps

**Inrush** — 700 Amps

#### General Characteristics

**Temperature Range** — -55°C to +71°C

**Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles

**Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles

**Dielectric Strength** — All Circuits to Ground — 1,250 Vrms  
Circuit to Circuit — 1,250 Vrms  
Coil to Ground and Aux. Contacts — 1,000 Vrms

**Weight** — 3.5 lbs

#### Coil Characteristics

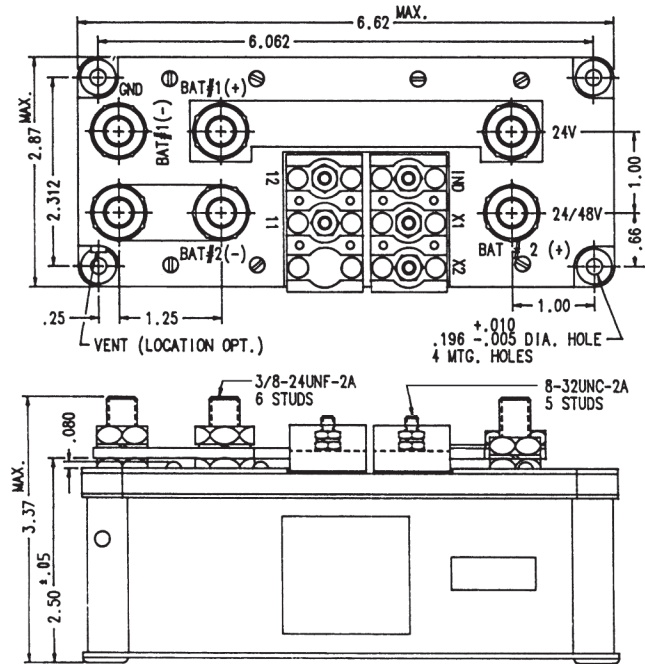
**Duty Cycle** — Intermittent

**Operating Voltage, Max.** — 31 Vdc

**Operating Voltage, Min.** — 18 Vdc

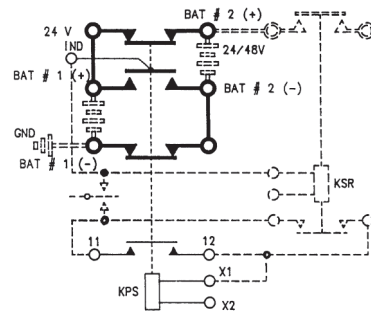
**Pickup Voltage @ 25°C, Max., Initial** — 12 Vdc

**Dropout Voltage** — 1.5 to 7 Vdc



Mounting Style A

**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1

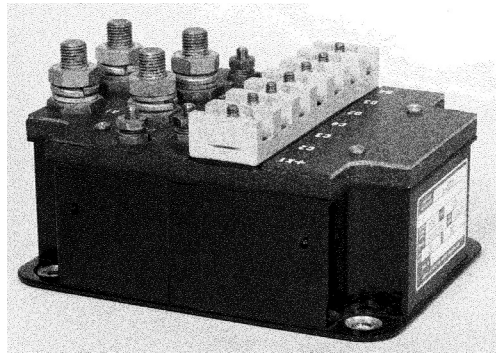
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
A-848KH	Gasket/Vented	A	Intermittent	1	1616082-2
A-848KH-2	Gasket/Vented	A	Intermittent	1	1616082-4

## A-848 Series, Rated up to 300 Amps, 28 Vdc

### Product Facts

- DPST NO, Double break and DPDT Double break
- Gasket sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

**Contact Arrangement** — A-848MAS/MLS: DPST NO, Double Break

A-848KLC: DPDT Double Break

**Rated Operating Voltage** — 28 Vdc

**Resistive Rating** — 300 Amps, A-848KLC – 200 Amps

#### General Characteristics

**Temperature Range** — -55°C to +71°C

**Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles

**Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles

**Dielectric Strength** — All Circuits to Ground — 1,250 Vrms  
Circuit to Circuit — 1,250 Vrms  
Coil to Ground and Aux. Contacts — 1,000 Vrms

**Weight** — 3.00 lbs

#### Coil Characteristics

**Duty Cycle** — Continuous

**Operating Voltage, Nom.** — 28 Vdc

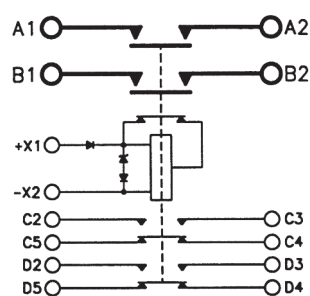
**Pickup Voltage, Max.** — 18 Vdc

**Dropout Voltage** — 9 Vdc (12 Vdc Hot)

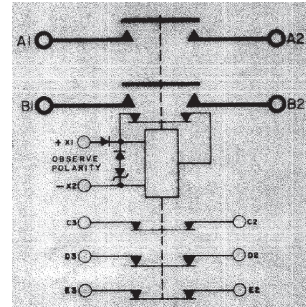
**Coil Current, Inrush, Max.** — 3.0 Amp

**Coil Current, Holding, Max.** — 0.35 Amp

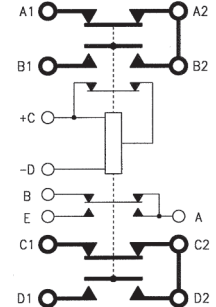
### Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 2

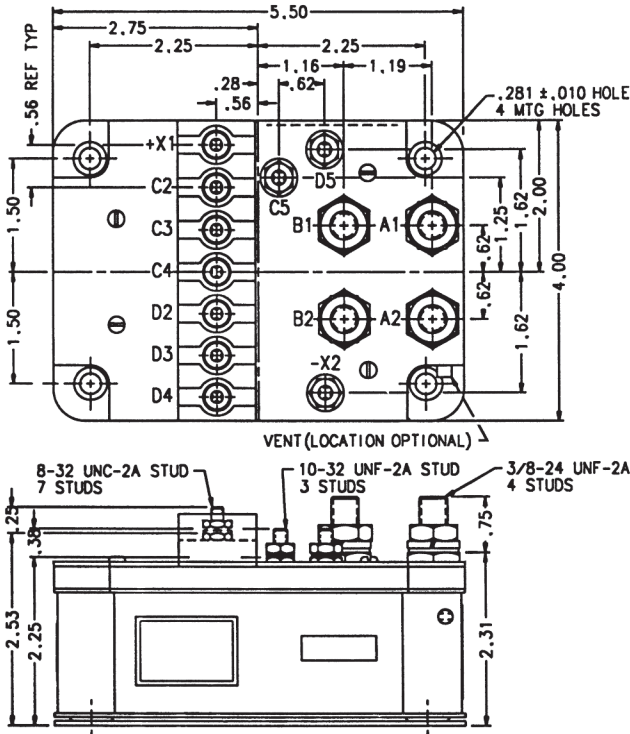


Circuit Configuration 3

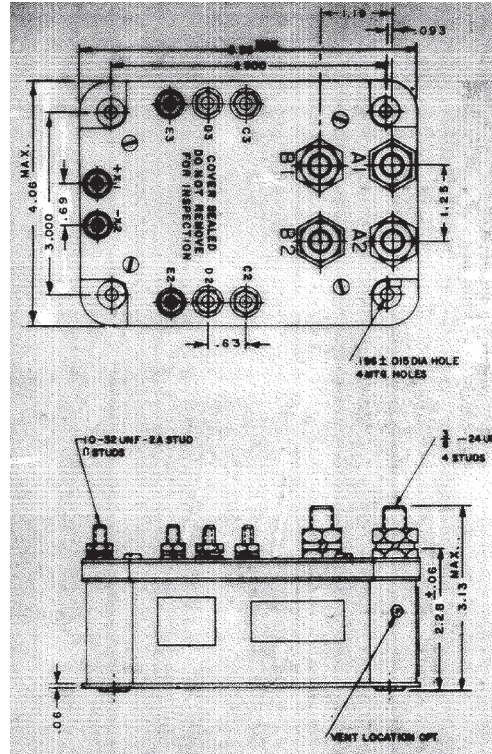
HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
A-848MAS	Gasket/Vented	A	Continuous w/Supp., Economizing	1	1616102-2
A-848MLS	Gasket/Vented	B	Continuous w/Supp., Economizing	2	1616102-3
A-848KLC	Gasket/Vented	C	Continuous, Economizing	3	1616082-6

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

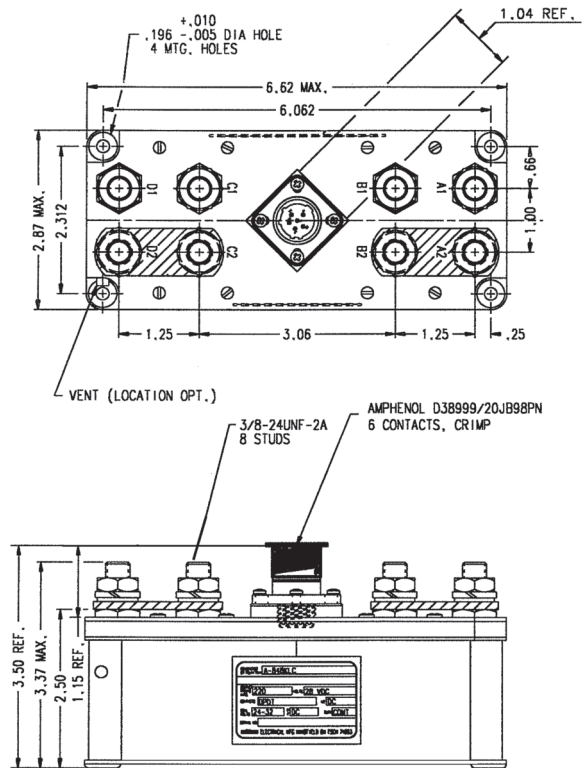
**A-48 Series, Rated up to 300 Amps, 28 Vdc** (Continued)



Mounting Style A



Mounting Style B



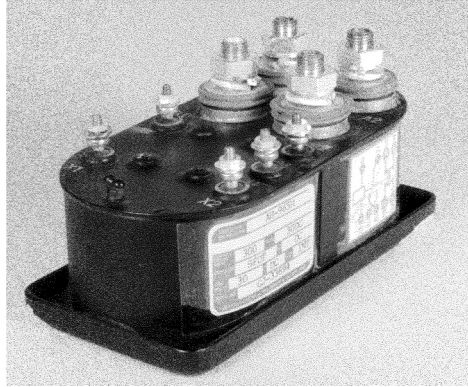
Mounting Style C

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

## AH-965 Series, Rated up to 300 Amps, 30 Vdc

### Product Facts

- SPDT NO, SPST NC
- Hermetically sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

**Contact Arrangement** — SPDT, Double Break

**Rated Operating Voltage** — 30 Vdc

**Resistive Rating** — 300 Amps

**Carry Only for 30 sec** — 1,000 Amps

**Carry Only, Inrush** — 1,500 Amps

**Rupture Rating** — 3,000 Amps

#### General Characteristics

**Temperature Range** — -65°C to +120°C

**Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles

**Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles

**Dielectric Strength** — All Circuits to Ground — 1,250 Vrms  
Circuit to Circuit — 1,250 Vrms  
Coil to Ground and Aux. Contacts — 1,000 Vrms

**Altitude, Max.** — 50,000 ft.

**Weight, Max.** — 2.88 lbs

#### Coil Characteristics

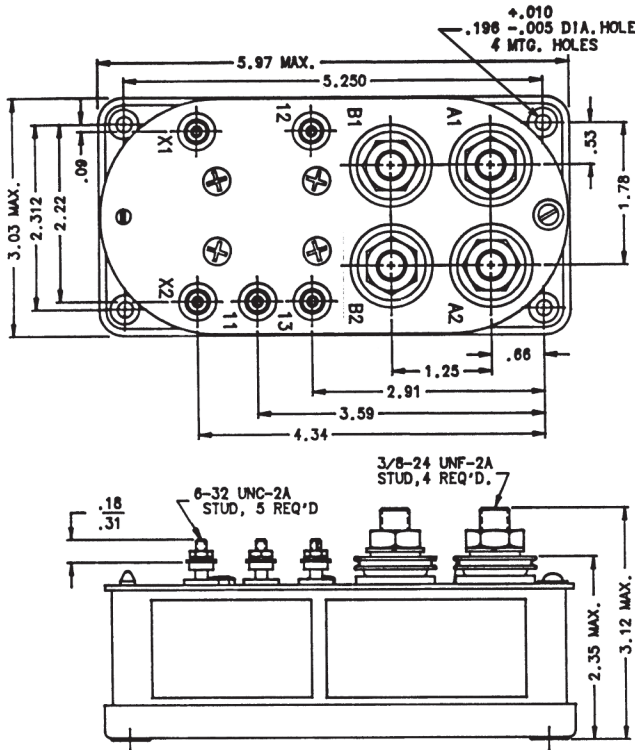
**Duty Cycle** — Intermittent, 3 minutes max.

**Operating Voltage, Max.** — 30 Vdc

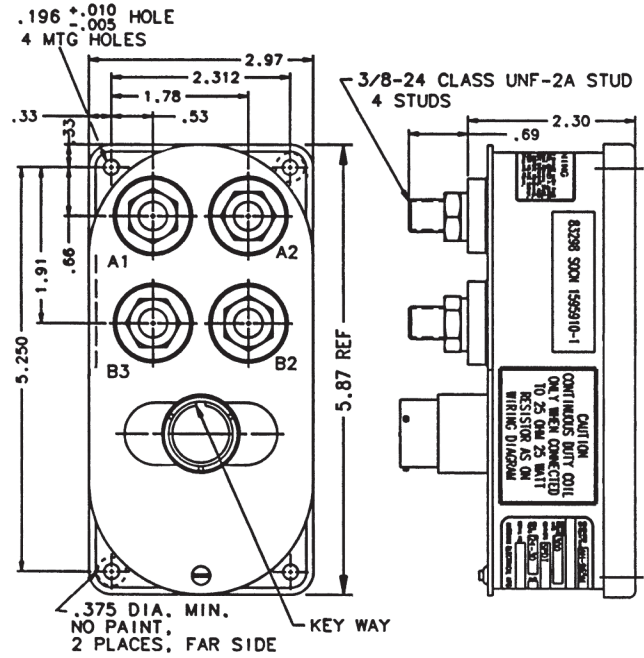
**Pickup Voltage, Max. Hot** — 20 Vdc

**Dropout Voltage** — 0.5 to 5 Vdc

**AH-965 Series, Rated up to 300 Amps, 30 Vdc** (Continued)

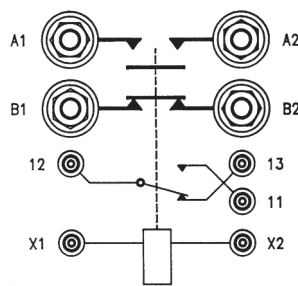


Mounting Style A

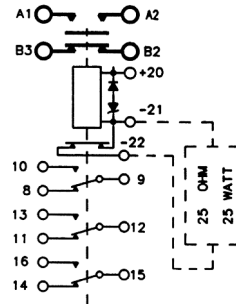


Mounting Style B

**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 2

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
AH-965H	Hermetically Sealed	A	Intermittent	1	1616084-1
AH-965M	Hermetically Sealed	B	Continuous w/ External 25 Ohm/25 Watt Resistor Connected	2	1616084-2

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



## A-400 Series, Rated up to 400 Amps, 28 Vdc

### Product Facts

- SPST NO, Double break
- Gasket sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

**Contact Arrangement** —

SPST NO, Double Break

**Rated Operating Voltage** —  
28 Vdc

**Resistive Rating** — 400 Amps

**Inductive Rating** — 100 Amps

**Inrush Rating** —  
A-400B, A-400D, A400DB-1 — 1,200  
Amps

A-400A, A-400AA, A-400L and  
A-400S — 1,500 Amps

**Rupture Rating** — 4,000 Amps

#### General Characteristics

**Temperature Range** —  
-55°C to +71°C

**Operating Cycles (Life) at Rated  
Resistive Load, Min.** — 50,000  
cycles

**Operating Cycles (Life)  
Mechanical, Min.** — 100,000 cycles

**Dielectric Strength** —  
All Circuits to Ground — 1,250 Vrms  
Circuit to Circuit — 1,250 Vrms  
Coil to Ground and Aux. Contacts —  
1,000 Vrms

**Altitude, Max.** — 50,000 ft.

**Weight** — 1.26 to 1.48 lbs

#### Coil Characteristics

**Duty Cycle** — Intermittent with  
Suppression, or Continuous with  
Suppression

**Operating Voltage, Nom.** —  
A-400A, A-400AA, A-400B, A-400D,  
A400DB-1, A-400DC, A-400G,  
A-400G-2, A-400L, A-400S — 28 Vdc

**Operating Voltage, Max.** —  
A-400A, A-400AA, A-400B, A-400D,  
A400DB-1, A-400L, A-400S — 30 Vdc  
A-400G, A-400G-2 — 31 Vdc  
A-400DC — 32 Vdc

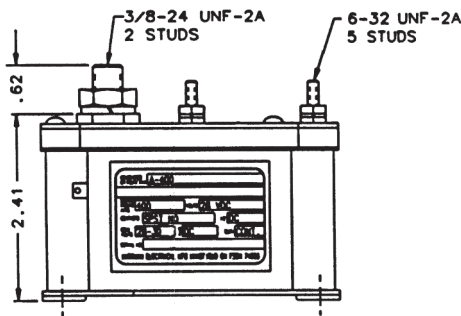
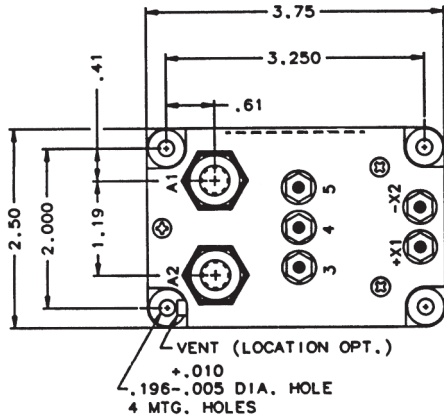
**Pickup Voltage, Max.** —  
A-400A, A-400AA, A-400L — 14 Vdc  
A-400B, A-400D, A400DB-1 — 18 Vdc  
A-400DC — Normal — 14 Vdc  
High Temp. — 18 Vdc  
A-400G — Normal — 15 Vdc  
High Temp. — 19 Vdc  
A-400G-2 — Normal — 10 Vdc  
High Temp. — 12.5 Vdc  
A-400S — +X to -X2 — 18 Vdc  
+Y1 to -Y2 — 13 Vdc

#### Dropout Voltage —

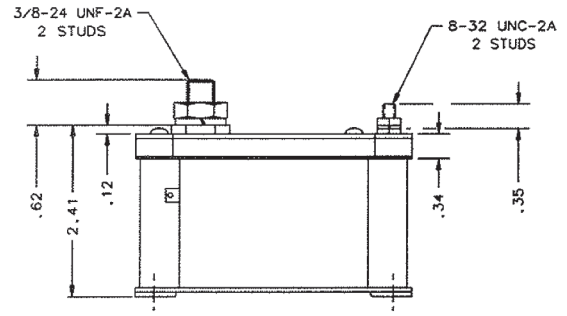
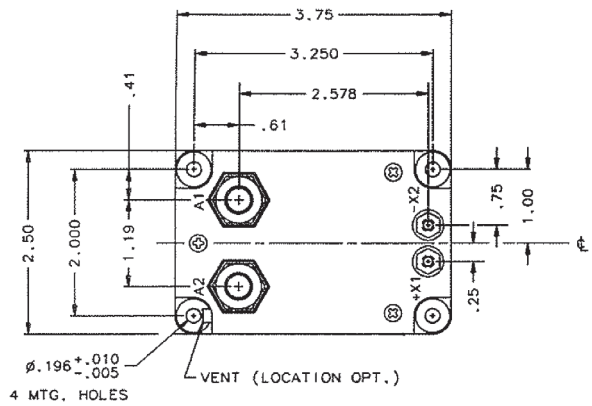
A-400L — 0.5 to 4 Vdc  
A-400A, A-400AA, — 1 to 5 Vdc  
A-400B, A-400D, A400DB-1 —  
1 to 7 Vdc  
A-400DC, A-400G, A-400G-2 —  
1.0 Vdc Min.  
A-400S — +X to -X2 — 1 to 7 Vdc  
+Y1 to -Y2 — 0.5 to 5 Vdc

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

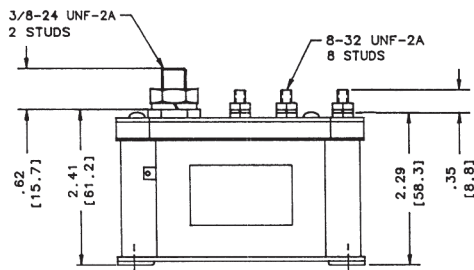
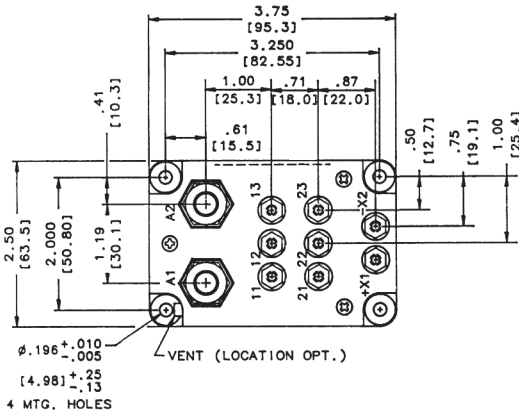
**A-400 Series, Rated up to 400 Amps, 28 Vdc (Continued)**



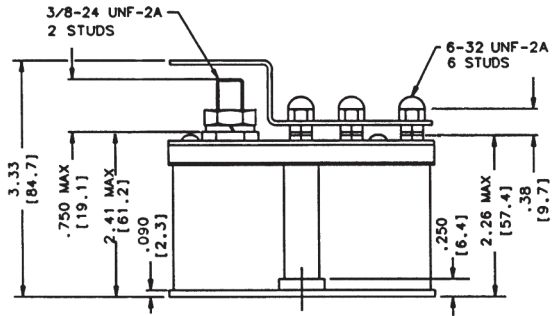
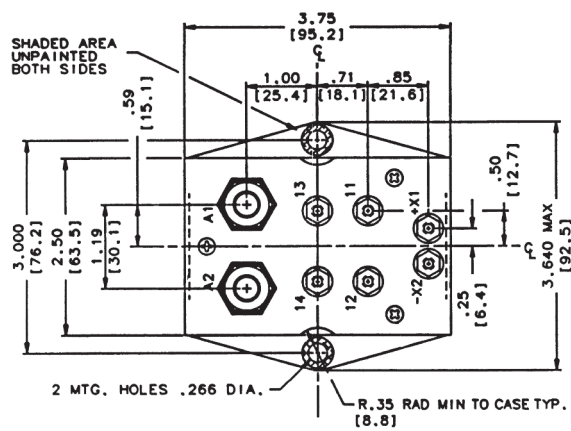
Mounting Style A



Mounting Style B



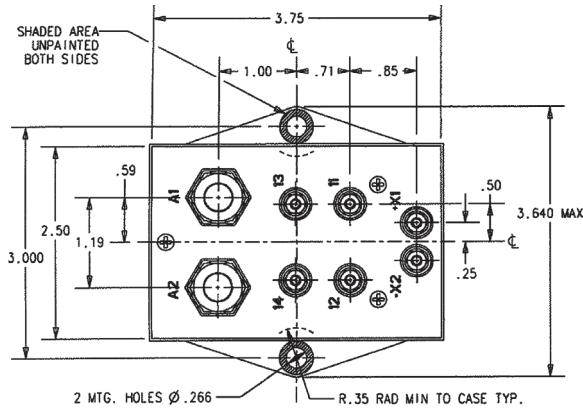
Mounting Style C



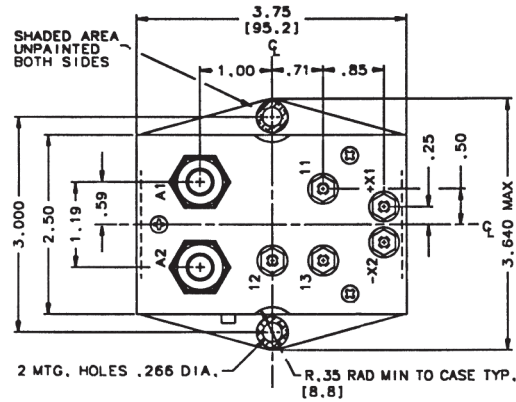
Mounting Style D

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

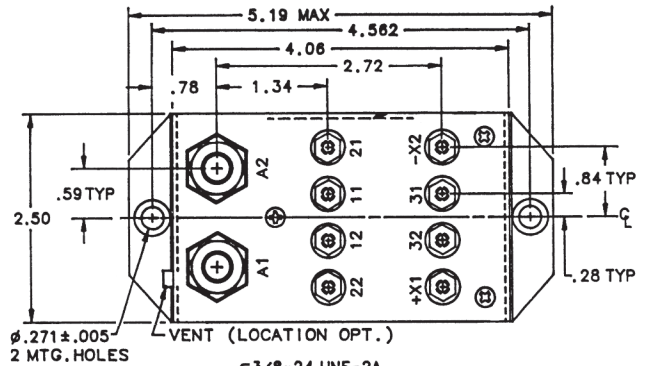
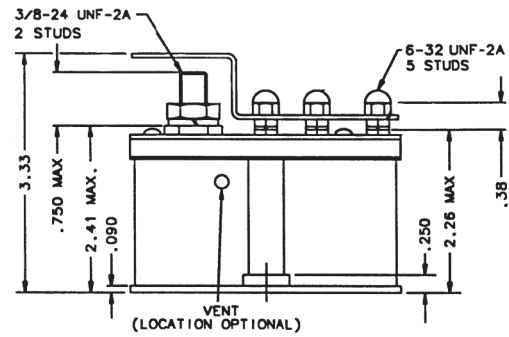
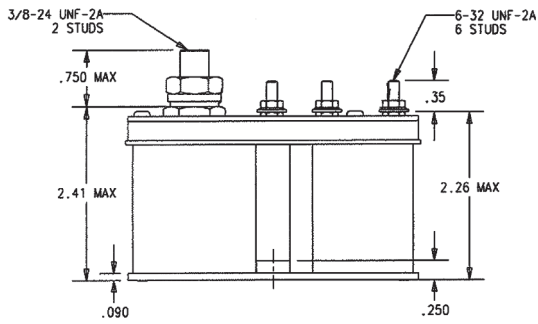
**A-400 Series, Rated up to 400 Amps, 28 Vdc** (Continued)



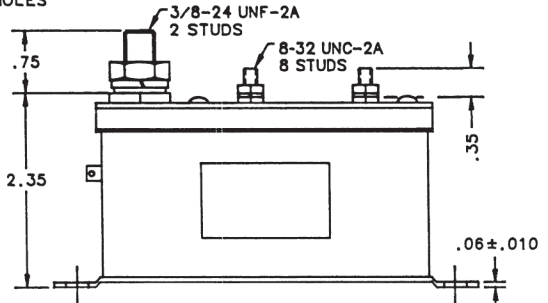
Mounting Style E



Mounting Style F

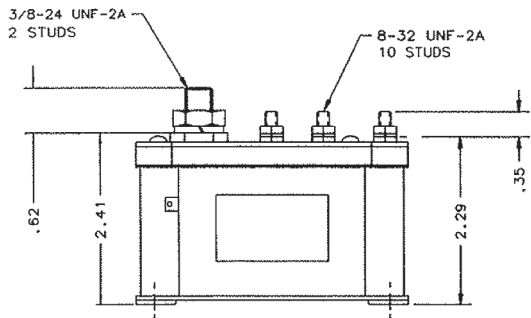
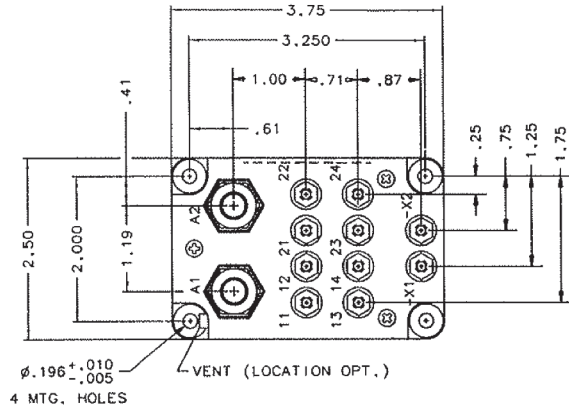


Mounting Style G

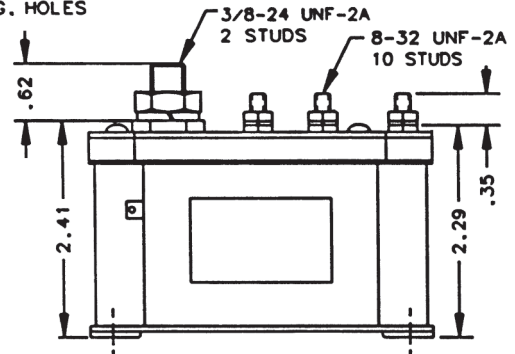
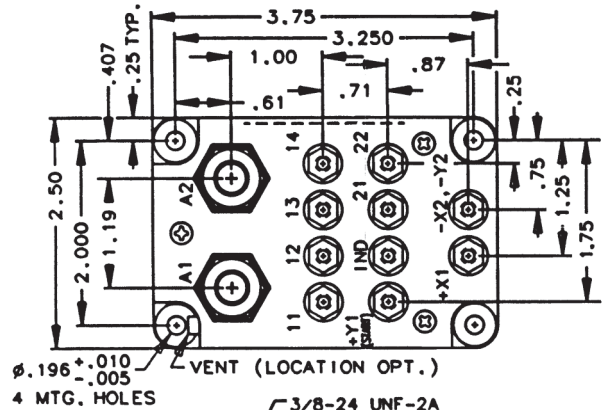


For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

**A-400 Series, Rated up to 400 Amps, 28 Vdc** (Continued)



Mounting Style I

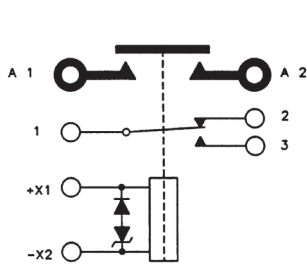


Mounting Style J

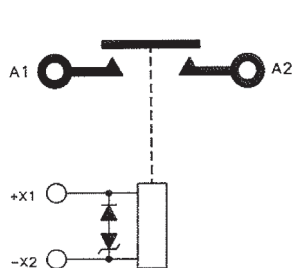
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

**A-400 Series, Rated up to 400 Amps, 28 Vdc** (Continued)

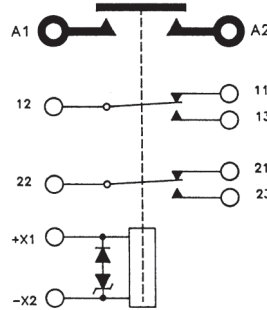
**Circuit Configurations** (Consult factory for other available circuit configurations)



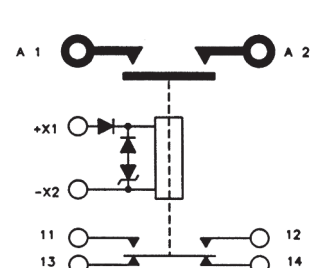
Circuit Configuration 1



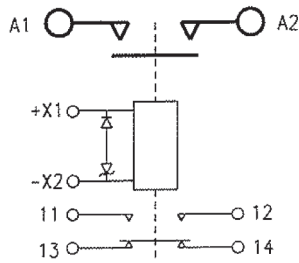
Circuit Configuration 2



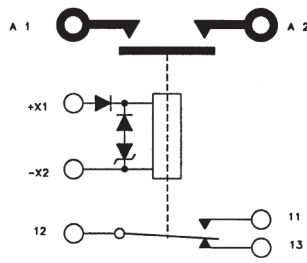
Circuit Configuration 3



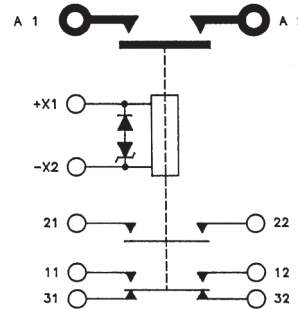
Circuit Configuration 4



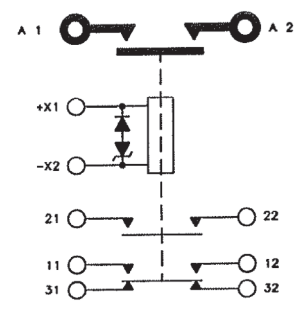
Circuit Configuration 5



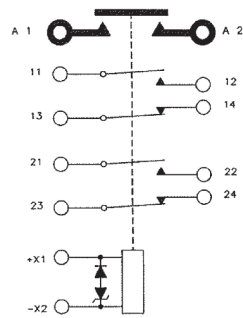
Circuit Configuration 6



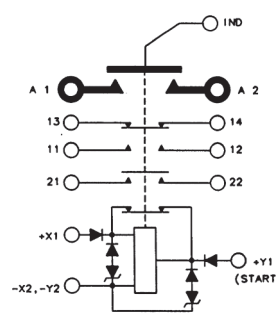
Circuit Configuration 7



Circuit Configuration 8



Circuit Configuration 9



Circuit Configuration 10

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
A-400A	Gasket/Vented	A	Intermittent	1	1-1616530-6
A-400AA	Gasket/Vented	B	Intermittent	2	1616056-2
A-400B	Gasket/Vented	C	Continuous	3	1616056-4
A-400D	Environ.	D	Continuous	4	1616056-5
A-400DB1	Environ.	E	Continuous	5	1-1616964-3
A-400DC	Gasket/Vented	F	Continuous	6	1616056-6
A-400G	Gasket/Vented	G	Intermittent	7	1616056-8
A-400G2	Gasket/Vented	G	Intermittent	8	6-1616949-1
A-400L	Gasket/Vented	I	Intermittent	9	1-1616530-5
A-400S	Gasket/Vented	J	Continuous/Intermittent	10	1616056-9

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

## A-703 and AH-703 Series, Rated up to 400 Amps, 28 Vdc\*

### Product Facts

- SPST NO, Double break
- Gasket sealed or Hermetically sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

**Contact Arrangement** —  
SPST NO, Double Break

**Rated Operating Voltage** —  
28 Vdc\* Except for A-703CSM which is  
36/40 Vdc

**Resistive Rating** — 400 Amps

**Resistive for 30 sec** — 1,000 Amps

**Inrush Rating** — 1,500 Amps

#### General Characteristics

**Temperature Range** —  
-55°C to +71°C

**Operating Cycles (Life) at Rated  
Resistive Load, Min.** — 50,000  
cycles

**Operating Cycles (Life)  
Mechanical, Min.** — 100,000 cycles

**Dielectric Strength** —  
All Circuits to Ground — 1,250 Vrms  
Circuit to Circuit — 1,250 Vrms  
Coil to Ground and Aux. Contacts —  
1,000 Vrms

**Weight** — 2.12 to 2.88 lbs

**Pickup Time, @ Nom. Voltage,  
Max.** — 35 msec

**Dropout Time, @ Nom. Voltage,  
Max.** — 35 msec

**Bounce Time, @ Nom. Voltage,  
Max.** — .004 msec

#### Coil Characteristics

**Duty Cycle** —  
Intermittent (Type A, See diagram  
below), Intermittent with suppression  
(Type B, See diagram below),  
Continuous, economized (Type C,  
See diagram below) or Continuous,  
economized with suppression (Type D,  
See diagram below)

**Operating Voltage** —  
28 Vdc Nominal

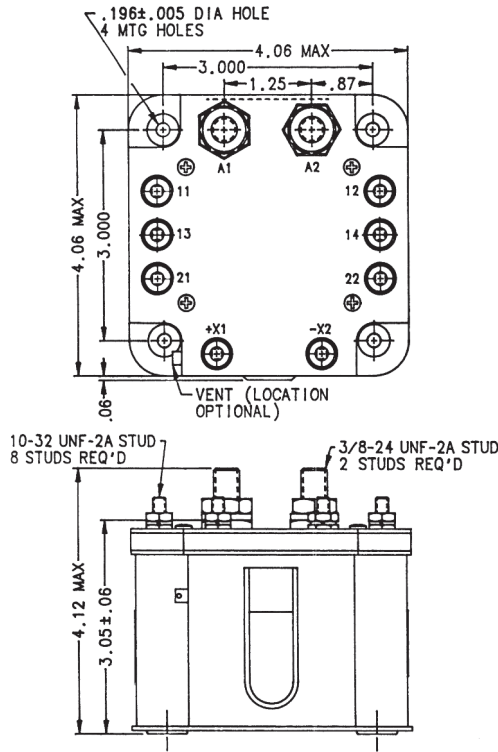
**Pickup Voltage @ 25°C, Max.** —  
A-703B — 8 Vdc  
A-703DBH — 10 Vdc  
A-703, A-703CD, A-703CSM, A-703D,  
A-703FA, A-703FB, A-703FSS,  
A-703ZS — 12 Vdc  
A-703T — 13 Vdc  
AH-703F, A-703E, A-703G-1, A-703GC,  
A-703GS, A-703R, AH-703F — 16 Vdc

#### Dropout Voltage

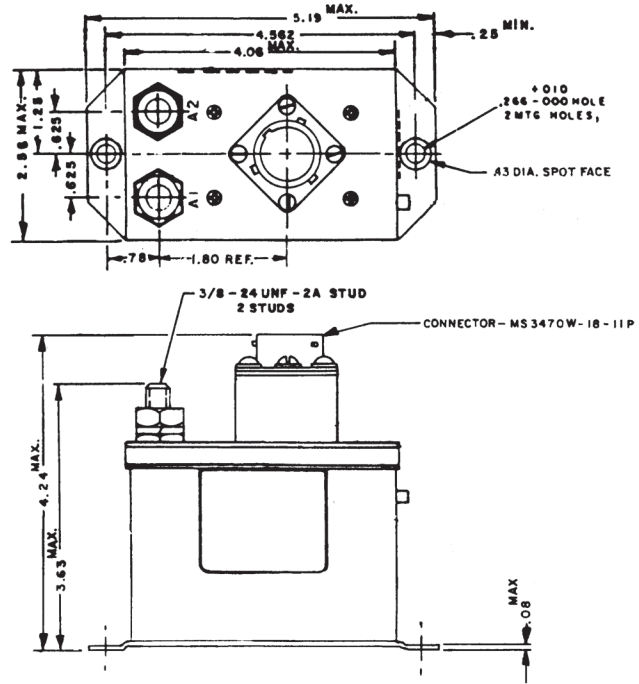
A-703B — 0.5 to 3 Vdc  
A-703CD, A-703FA, A-703FB —  
0.5 to 5 Vdc  
A-703T — 0.5 to 6 Vdc  
A-703, A-703CSM, A-703D, A-703FSS,  
A-703ZS — 0.5 to 7 Vdc  
A-703DBH, A-703E, A-703R —  
1.0 to 7 Vdc  
AH-703F, A-703G-1, A-703GC, A-  
703GS, AH-703F — 1.5 to 7 Vdc

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

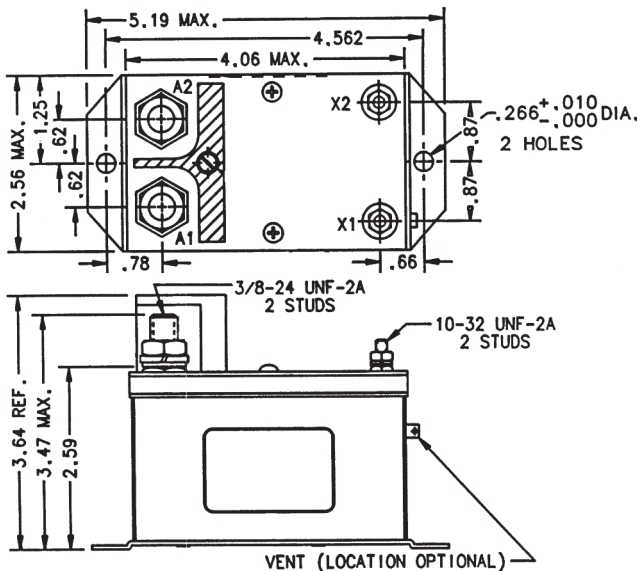
**A-703 and AH-703 Series, Rated up to 400 Amps, 28 Vdc** (Continued)



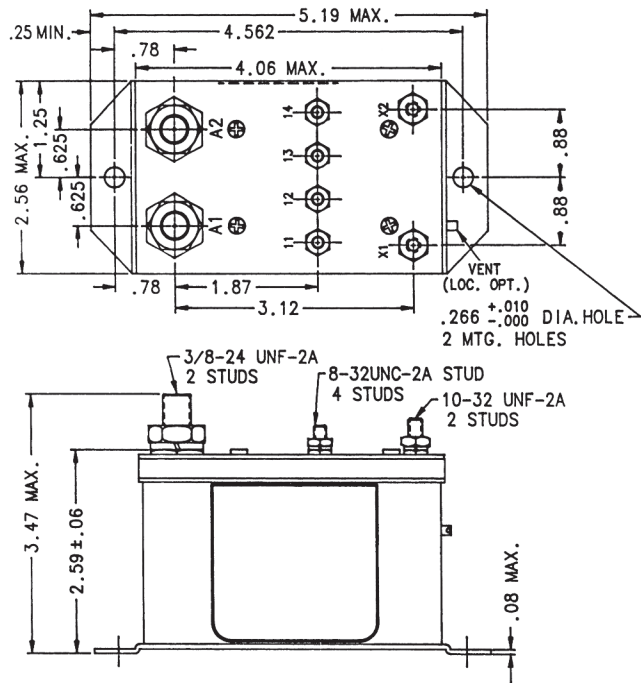
Mounting Style A



Mounting Style B



Mounting Style C



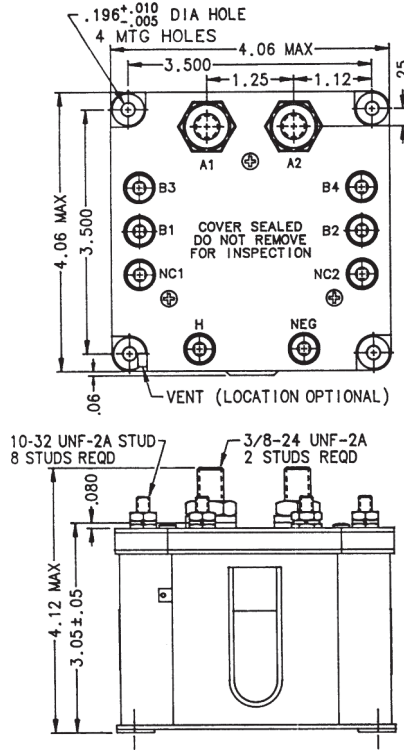
Mounting Style D

6

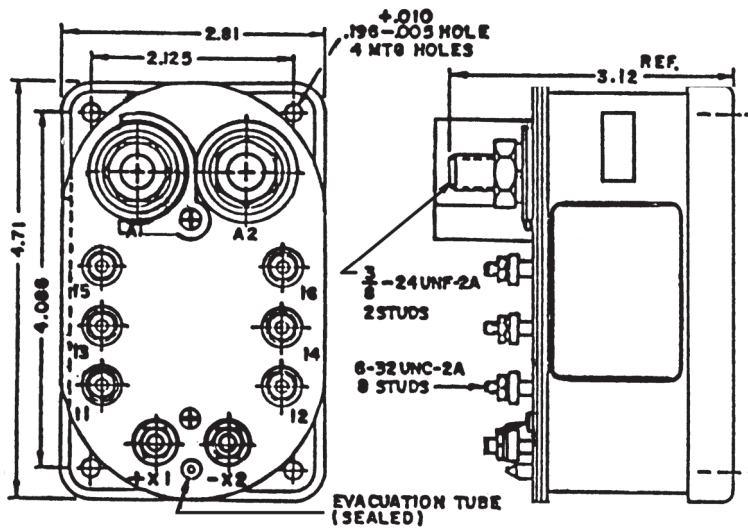
HARTMAN Power Switching DC Contactors

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

**A-703 and AH-703 Series, Rated up to 400 Amps, 28 Vdc** (Continued)



Mounting Style E



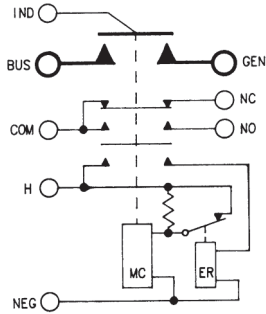
Mounting Style F

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

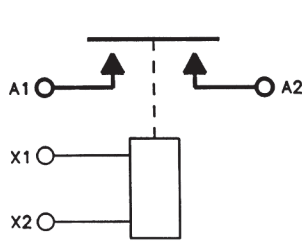


**A-703 and AH-703 Series, Rated up to 400 Amps, 28 Vdc (Continued)**

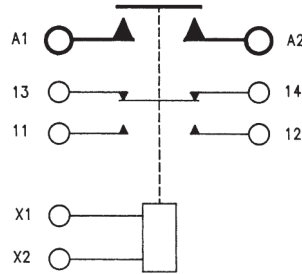
**Circuit Configurations** (Consult factory for other available circuit configurations)



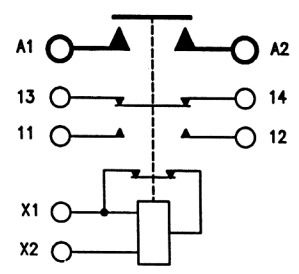
**Circuit Configuration 1**



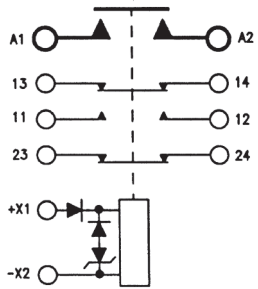
**Circuit Configuration 2**



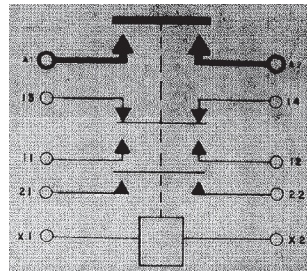
**Circuit Configuration 3**



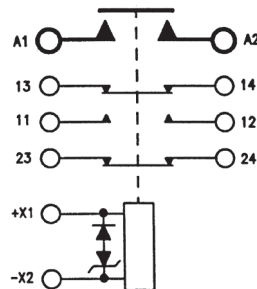
**Circuit Configuration 4**



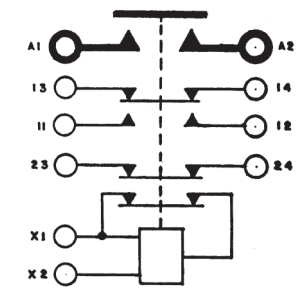
**Circuit Configuration 5**



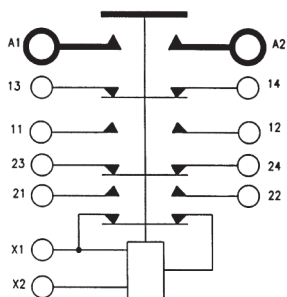
**Circuit Configuration 6**



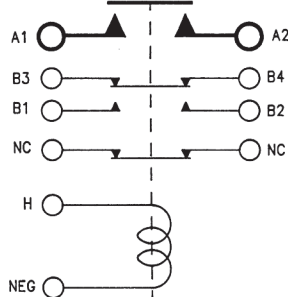
**Circuit Configuration 7**



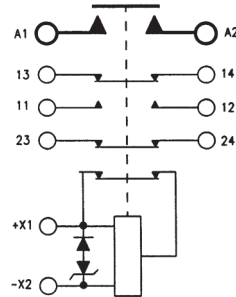
**Circuit Configuration 8**



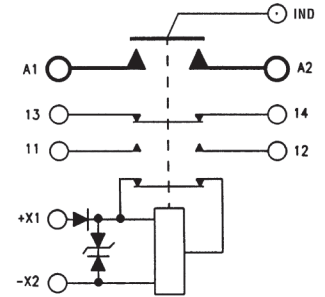
**Circuit Configuration 9**



**Circuit Configuration 10**



**Circuit Configuration 11**

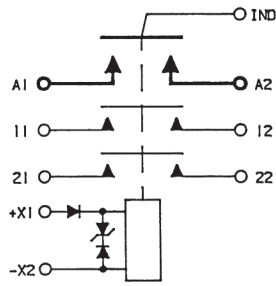


**Circuit Configuration 12**

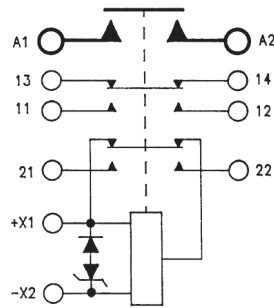
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

**A-703 and AH-703 Series, Rated up to 400 Amps, 28 Vdc** (Continued)

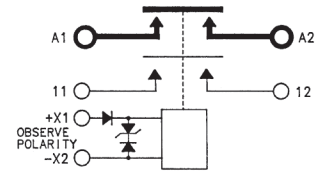
**Circuit Configurations** (Consult factory for other available circuit configurations)



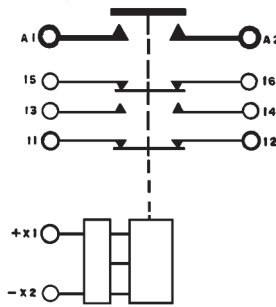
Circuit Configuration 13



Circuit Configuration 14



Circuit Configuration 15



Circuit Configuration 16

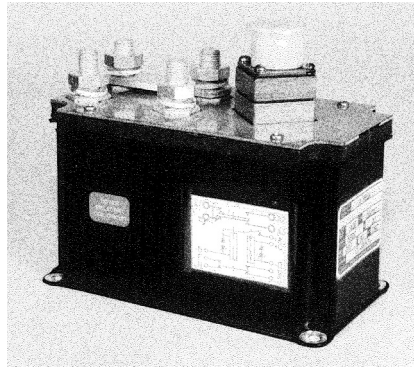
HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
A-703	Gasket/Vented	A	Continuous, Economized	1	1616058-1
A-703CD	Gasket/Vented	C	Intermittent	2	1616058-6
A-703CSM	Gasket/Vented	D	Intermittent	15	1616058-7
A-703D	Gasket/Vented	D	Intermittent	3	1616058-8
A-703DBH	Gasket/Vented	D	Intermittent	3	1-1616058-0
A-703E	Gasket/Vented	D	Continuous, Economized	4	1-1616058-1
A-703FA	Gasket/Vented	D	Intermittent w/Supp.	5	1-1616058-2
A-703FB	Gasket/Vented	D	Intermittent	6	1-1616058-3
A-703FSS	Gasket/Vented	D	Intermittent w/Supp.	7	1-1616058-4
A-703G-1	Gasket/Vented	D	Continuous, Economized	8	1-1616058-5
A-703GC	Gasket/Vented	D	Continuous, Economized	19	1-1616058-6
A-703B	Gasket/Vented	E	Intermittent	10	1616058-3
A-703GS	Gasket/Vented	D	Continuous, Economized w/Supp.	11	1-1616058-7
A-703R	Gasket/Vented	D	Continuous, Economized w/Supp.	12	1-1616058-9
A-703T	Gasket/Vented	D	Intermittent w/Supp.	13	2-1616058-0
A-703ZS	Gasket/Vented	A	Continuous, Economized w/Supp.	14	2-1616058-2
AH-703F	Hermetically Sealed	F	Continuous, Economized w/Supp.	16	1616061-1

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

## A-981 Series, Rated up to 400 Amps, 28 Vdc

### Product Facts

- SPDT, Double break or SPST NO, SPST NC
- Gasket sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

**Contact Arrangement** — SPDT, Double Break or SPST NO, SPST NC

**Rated Operating Voltage** — 28 Vdc

**Resistive Rating** — 400 Amps

**Inrush for 30 sec** — 1,000 Amps

**Inrush** — 1,500 Amps

#### General Characteristics

**Temperature Range** — -55°C to +71°C

**Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles

**Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles

**Dielectric Strength** —  
 All Circuits to Ground — 1,250 Vrms  
 Circuit to Circuit — 1,250 Vrms  
 Coil to Ground and Aux. Contacts — 1,000 Vrms

**Weight, Max.** — 3.2 lbs

#### Coil Characteristics

**Duty Cycle** — Continuous with suppression

**Operating Voltage, Max.** — 31 Vdc

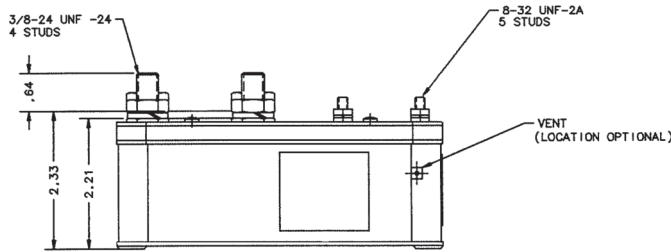
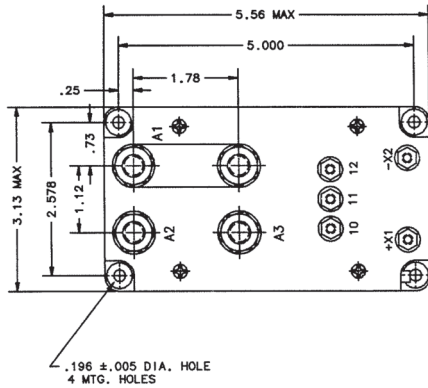
**Operating Voltage, Min.** — 17 Vdc

**Pickup Voltage, Max.** — 18 Vdc

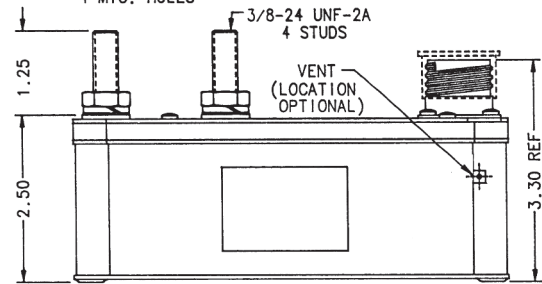
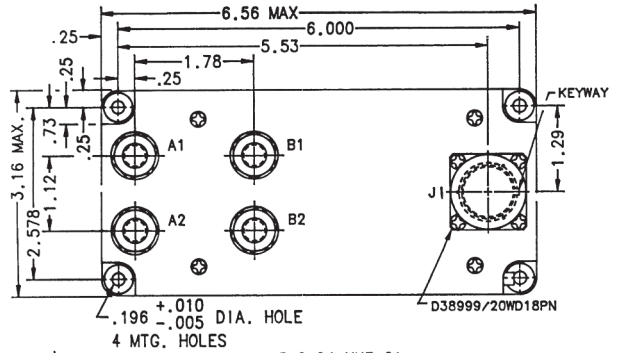
**Dropout Voltage @ 25°C** — 1 to 10 Volts

**Coil Current, Inrush, Max.** — 4.5 Amp

**A-981 Series, Rated up to 400 Amps, 28 Vdc** (Continued)

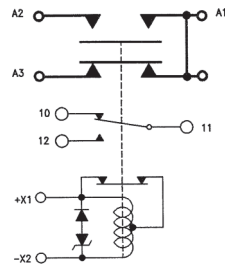


Mounting Style A

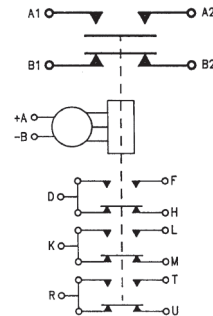


Mounting Style B

**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 2

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
A-981S	Gasket/Vented	A	Continuous, Economizing w/Supp.	1	1616083-7
A-981P	Gasket/Vented	B	Continuous, Economizing w/Supp.	2	1616083-6

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

**A-792 Series, Rated up to 500 Amps, 50 Vdc**

**Product Facts**

- SPST NO, Quad. break
- Gasket sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106

**Performance Data**

**Electrical Characteristics**

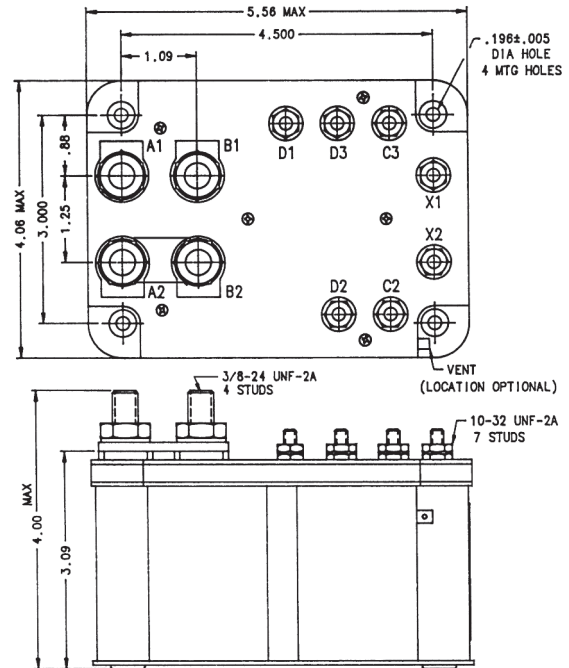
- Main Contacts** —
- Contact Arrangement** — SPST NO, Quad. Break
- Rated Operating Voltage** — 50 Vdc
- Resistive Rating** — 500 Amps
- Auxiliary Contacts** —
- Aux. Contact Arrangement** — SPDT, SPST NC
- Rated Operating Voltage** — 38 Vdc
- Resistive Rating** — 5 Amps

**General Characteristics**

- Temperature Range** — -55°C to +71°C
- Operating Cycles (Life) at Rated Resistive Load** — 50,000 cycles
- Operating Cycles (Life) Mechanical** — 100,000 cycles
- Weight, Max.** — 4 lb 8 oz.

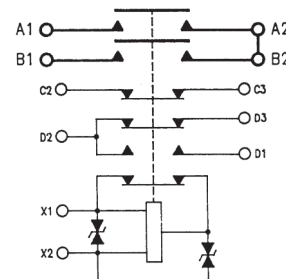
**Coil Characteristics**

- Duty Cycle** — Continuous, economizing
- Operating Voltage, Nom.** — 35-39 Vdc
- Pickup Voltage @ 25°C, Max.** — 20 V
- Resistance @ 25°C** — Pickup — 27 Ohm ± 20%  
Hold — 111 Ohm ± 20%
- Suppression, Peak, Max.** — 50 V



Mounting Style A

**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1

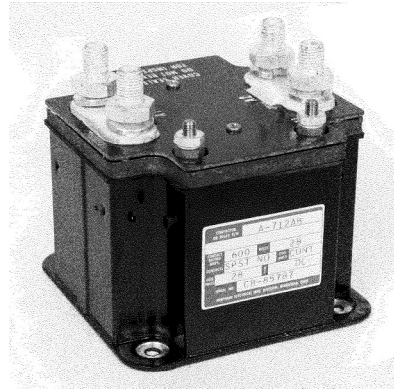
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
A-792SFS	Gasket/Vented	A	Continuous, Economizing w/Supp.	1	1616101-2

**A-712 Series, Rated up to 600 Amps, 28 Vdc**

**Product Facts**

- SPST NO, Double break
- Gasket sealed
- Meets requirements of MIL-PRF-6106



**Performance Data**

**Electrical Characteristics**

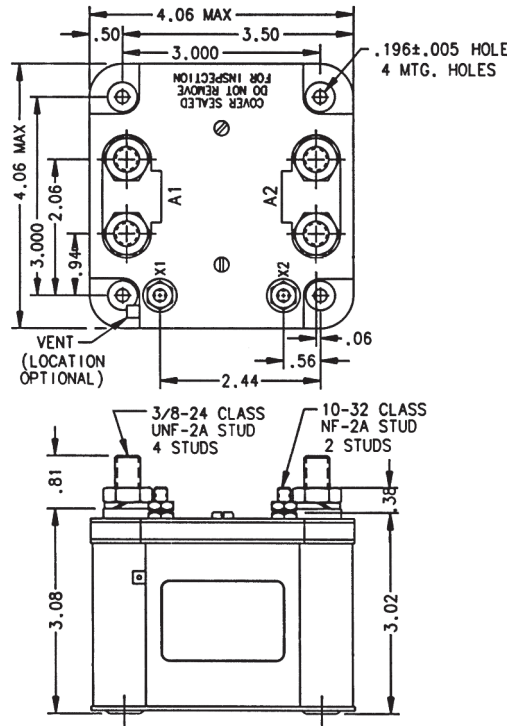
- Contact Arrangement** — SPST NO, Double Break
- Rated Operating Voltage** — 28 Vdc
- Resistive Rating** — 600 Amps

**General Characteristics**

- Temperature Range** — -55°C to +71°C
- Operating Cycles (Life) at Rated Resistive Load** — 50,000 cycles
- Operating Cycles (Life) Mechanical** — 100,000 cycles
- Dielectric Strength** — All Circuits to Ground — 1,250 Vrms  
Circuit to Circuit — 1,250 Vrms  
Coil to Ground and Aux. Contacts — 1,000 Vrms
- Weight, Max.** — 3.00 lbs - 3 lbs 7 oz.

**Coil Characteristics**

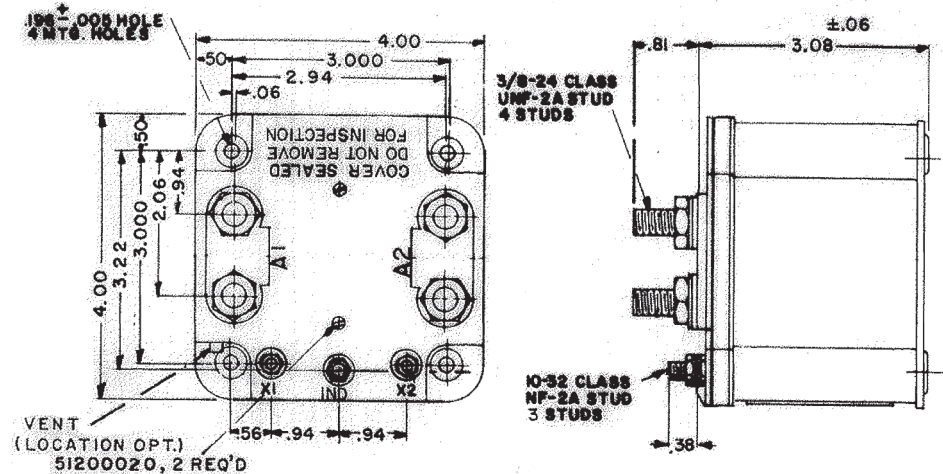
- Duty Cycle** — Continuous or Intermittent
- Operating Voltage, Max.** — 29 Vdc
- Coil Voltage, Nom.** — 24-28 Vdc
- Pickup Voltage, Max.** — 18 Vdc
- Dropout Voltage** — 1 to 5 Vdc
- Coil Current, Hold, Max.** — 0.6 Amp



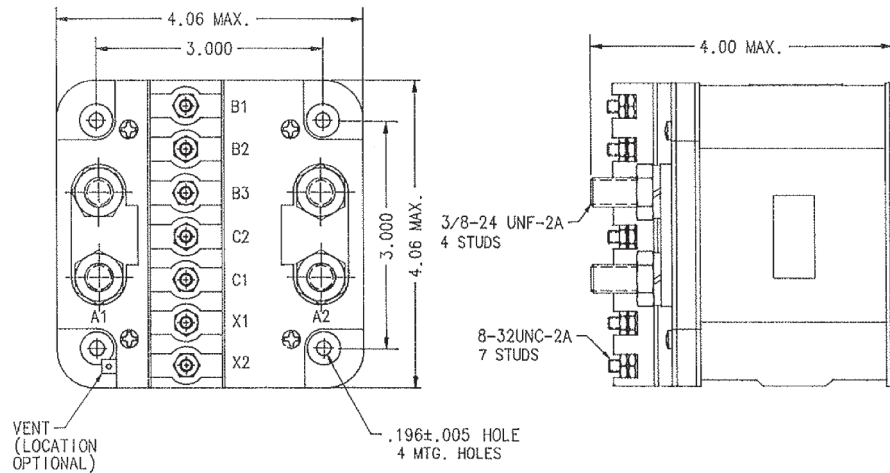
**Mounting Style A**

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

**A-712 Series, Rated up to 600 Amps, 28 Vdc** (Continued)

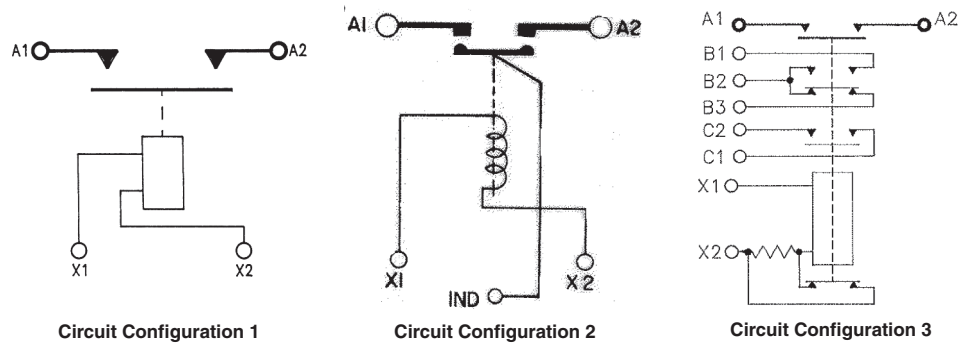


Mounting Style B



Mounting Style C

**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1

Circuit Configuration 2

Circuit Configuration 3

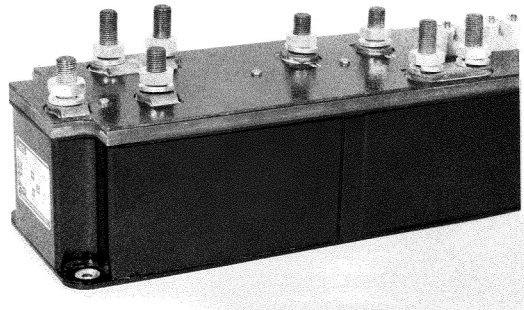
HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
A-712AB	Gasket/Vented	A	Continuous	1	2-1616058-3
A-712AF	Gasket/Vented	A	Intermittent	1	2-1616058-4
A-712J	Gasket/Vented	B	Continuous	2	2-1616058-6
A-712W	Gasket/Vented	C	Continuous, Economizing	3	6-1616032-3

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

## A-882 Series, Rated up to 600 Amps, 28/48 Vdc

### Product Facts

- 2PDT, Double break
- Gasket sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

##### Main Contacts —

**Contact Arrangement** —  
2PDT, Double Break

**Rated Operating Voltage** —  
28/48 Vdc

**Resistive Rating** — 600 Amps

**Resistive for 30 sec** — 1,000 Amps

**Motor Rating** — 1,500 Amps, Inrush only

##### Auxiliary Contacts —

**Aux. Contact Arrangement** —  
SPST NO

**Resistive Rating** — 5 Amps

**Inductive Rating** — 5 Amps

#### General Characteristics

**Temperature Range** —  
-65°C to +160°C

**Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles

##### Operating Cycles (Life)

**Mechanical, Min.** — 100,000 cycles

##### Dielectric Strength —

All Circuits to Ground — 1,250 Vrms

Circuit to Circuit — 1,250 Vrms

Coil to Ground and Aux. Contacts —  
1,000 Vrms

**Altitude, Max.** — 50,000 ft

**Weight** — 8.75 lbs

#### Coil Characteristics

**Duty Cycle** — Intermittent

**Operating Voltage, Max.** — 29 Vdc

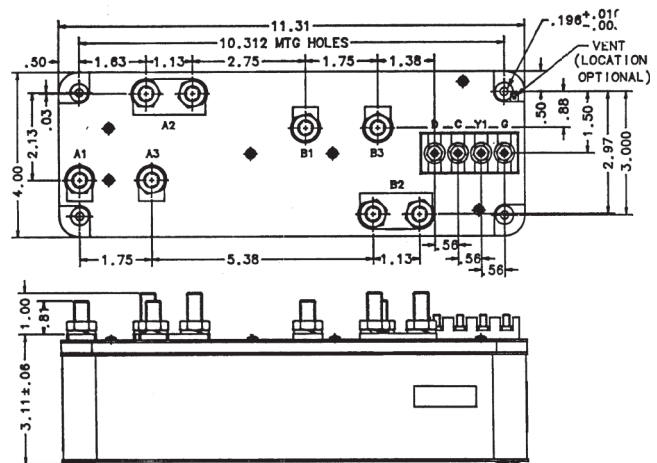
**Operating Voltage, Min.** — 18 Vdc

**Pickup Voltage, Max., Hot** — 18 Vdc

**Dropout Voltage, Max., Hot** — 7 Vdc

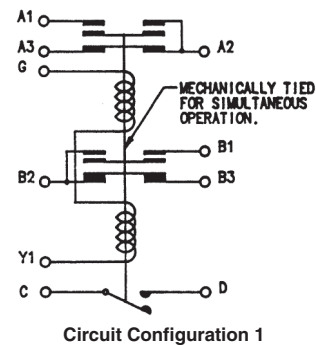
**Coil Current, Max. @ 70°F** —  
8 Amps

**Coil Current, Max. @ -65°F** —  
9.6 Amps



Mounting Style A

**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

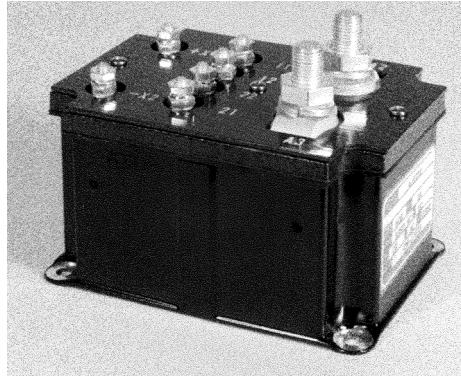
HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
A-882DL	Gasket/Vented	A	Intermittent	1	1616102-6



**A-931 Series, Rated up to 600 Amps, 28 Vdc**

**Product Facts**

- SPST NC, Double break
- Gasket sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



**Performance Data**

**Electrical Characteristics**

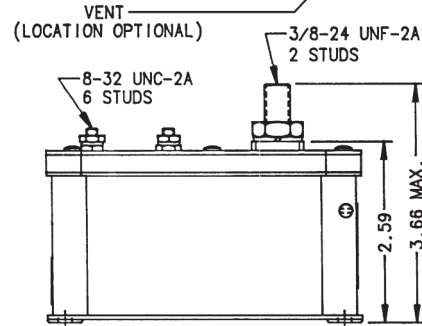
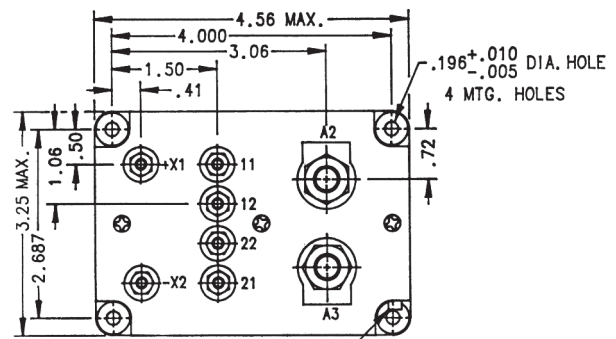
- Main Contacts** — SPST NC, Double Break
- Rated Operating Voltage** — 28 Vdc
- Resistive Rating** — 600 Amps
- Inrush for 30 sec** — 1,000 Amps
- Inrush for 5 min** — 800 Amps
- Auxiliary Contacts** — DPST
- Rated Operating Voltage** — 28 Vdc
- Resistive Rating** — 5 Amps

**General Characteristics**

- Temperature Range** — -55°C to +71°C
- Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles
- Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles
- Dielectric Strength** — All Circuits to Ground — 1,250 Vrms  
Circuit to Circuit — 1,250 Vrms  
Coil to Ground and Aux. Contacts — 1,000 Vrms
- Weight, Max.** — 3.00 lbs

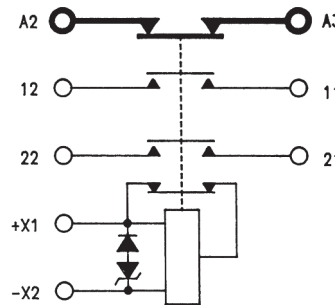
**Coil Characteristics**

- Duty Cycle** — Continuous, economizing
- Operating Voltage, Max.** — 30 Vdc
- Operating Voltage, Min.** — 18 Vdc
- Pickup Voltage, Initial, Max. @ 71°C** — 10 Vdc
- Dropout Voltage** — 1 to 7 Vdc
- Resistance, Inrush ± 20% @ 25°C** — 3 Ohm
- Resistance, Hold ± 20% @ 25°C** — 80 Ohm



Mounting Style A

**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1

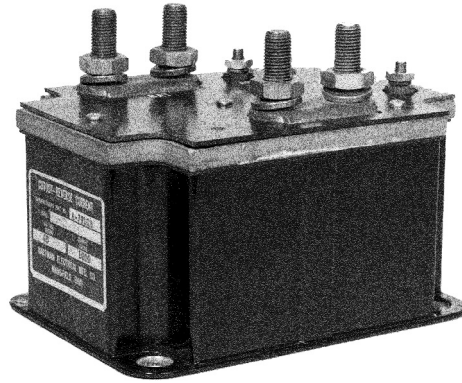
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
A-931F	Gasket/Vented	A	Continuous, Economizing w/Supp.	1	1616060-1

**A-981 Series, Rated up to 600 Amps, 28/48 Vdc**

**Product Facts**

- SPDT, Double break or 1PST NO, 1PST NC
- Gasket sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



**Performance Data**

**Electrical Characteristics**

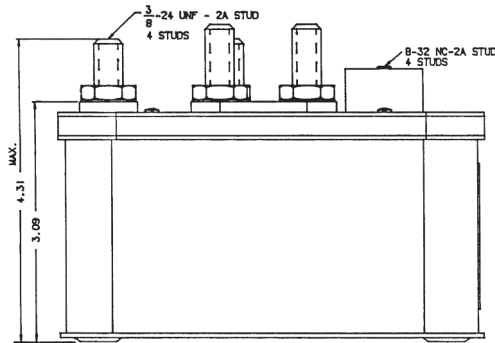
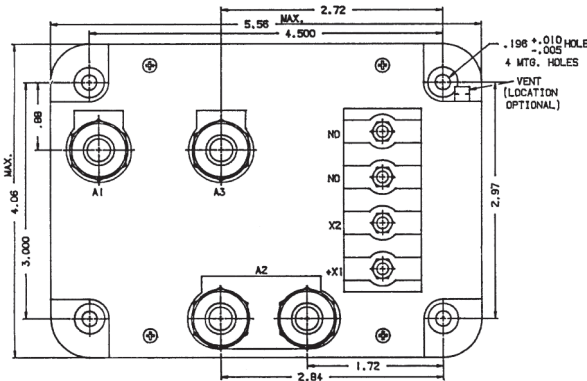
**Contact Arrangement** — SPST NC, Double Break or 1PST NO, 1PST NC  
**Rated Operating Voltage** — 28 Vdc  
**Resistive Rating** — 600 Amps  
**Inrush for 30 sec** — 1,000 Amps  
**Motor Rating** — 1,500 Amps, Inrush only

**General Characteristics**

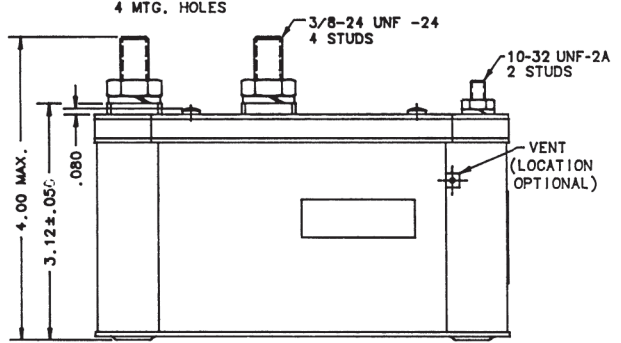
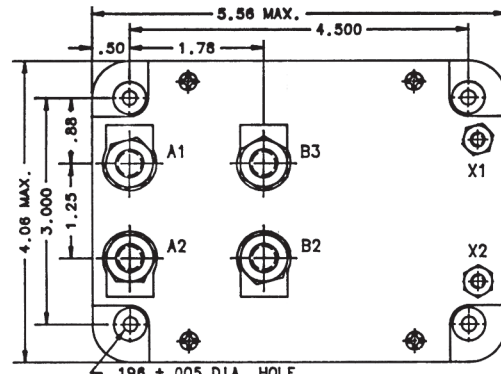
**Temperature Range** — -55°C to +71°C  
**Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles  
**Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles  
**Weight, Max.** — A-981E — 4 lbs 5 oz  
 A-981K — 4.5 lbs

**Coil Characteristics**

**Duty Cycle** — A-981E — Continuous  
 A-981K — Continuous, economizing  
**Operating Voltage** — A-981E — 28 Vdc  
 A-981K — 24 Vdc min. to 30 Vdc max.  
**Pickup Voltage** — A-981E — 18 Vdc max. hot  
 A-981K — 16 Vdc max. initial @ 25°C  
**Dropout Voltage** — A-981E — 10 Vdc max. hot  
 A-981K — 1 to 10 Vdc



**Mounting Style A**

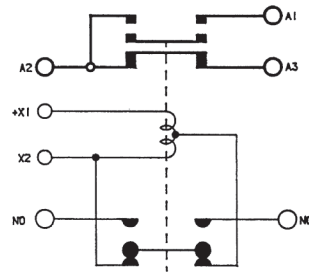


**Mounting Style B**

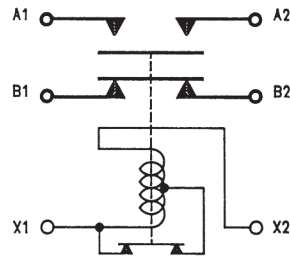
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

**A-981 Series, Rated up to 600 Amps, 28/48 Vdc** (Continued)

**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 2

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
A-981E	Gasket/Vented	A	Continuous, Economizing	1	1616083-1
A-981K	Gasket/Vented	B	Continuous, Economizing	2	1616083-2

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

**Cross Reference**

Main Current Rating	AC/DC	Rating	Main Contact Config.	Operating Mode	Aux. Contact Config.	Coil Voltage (VDC)	Seal Type	Duty Cycle	Coil Trans. Voltage	Hartman Part No.	TE Part No.
25	DC	28	SPDT NO SPDT NC	Side Stable	–	30	Hermetic	Cont.	–	DH-14A	1616089-1
		28	SPDT NO SPDT NC	Side Stable	–	30	Hermetic	Cont.	–	DH-14AL	1616089-2
		28	SPDT NO SPDT NC	Side Stable	–	30	Hermetic	Cont.	42	DH-14AT	1616089-3
		3	SPDT NO SPDT NC	Side Stable	–	28	Hermetic	Intermittent	–	DH-21N	1616026-2
50	DC	28	SPST NO SPST NC	Side Stable	–	28	Gasket/Vented	Cont.	–	D-7AC	1616088-1
		28	SPST NO	Side Stable	DPDT	28	Gasket/Vented	Cont.	–	D-7LHB	1616064-1
		28	4PDT	Center Off	–	28	Hermetic	Cont.	–	DH-18DA	1616050-2
		28	SPST NO SPST NC	Side Stable	DPDT	18-30	Hermetic	Cont.	50	DH-7ATK	1616089-7
		28	2PST NO	Side Stable	–	28	Hermetic	Cont.	–	DH-7MN	1616103-2
		28	SPST NO SPST NC	Side Stable	(2)SPST NO	28	Hermetic	Cont.	–	DH-7TB	1-1616089-3
100	DC	28	SPST NO	Side Stable	SPDT	24-32	Gasket	Cont.	–	A-1077DD	1616055-3
		28	SPDT	Side Stable	1NO, 1NC	24-30	Gasket	Cont.	45	A-1077S	1616081-3
100	DC	28	SPDT	Center Off	SPST NO	115VAC	Gasket/Vented	Cont.	–	D-31BAA	1616097-1
		28	(2)SPST	Center Off	SPST NO	28	Gasket/Vented	Cont.	45	D-32A	1616097-2
		28	1PST NO 1PST NC	Side Stable	–	18-22.5	Hermetic	Cont.	–	DH-25EA	1616089-4
200	DC	28	SPDT	Center Off	SPST NO	28	Hermetic	Cont.	–	DHR-31BA	1616098-1
		28	SPST NO	Side Stable	DPDT	24-30	Gasket	Int.	–	A-1077D	1616055-2
		28	SPST NO	Side Stable	DPDT	24-30	Gasket	–	–	A-1077F	1616055-4
		28	SPST NO	Side Stable	–	24-30	Gasket	Cont.	–	A-1077G	1616055-5
		28	SPST NO	Side Stable	DPDT	24-30	Gasket	Cont.	–	A-1077V	1616055-6
200	DC	28	SPST NO	Side Stable	DPDT	24-30	Gasket	Cont.	–	A-1077W	1616081-4
200	DC	28	SPST NC	Side Stable	DPST NO	24-30	Gasket/Vented	Int.	–	A-876K	1616059-1
230	DC	28	SPDT	Side Stable	DPDT	24-30	Gasket	Cont.	–	A-1077B	1616081-1
		28	SPST NO	Side Stable	SPDT	28	Gasket/Vented	Cont.	–	A-770AM	3-1616058-1
		29	SPST NO	Side Stable	SPST NO	28	Gasket/Vented	Cont.	–	A-770N	3-1616058-3
		28	SPST NO	Side Stable	–	24	Gasket/Vented	Cont.	–	A-770RF	3-1616058-4
		28	SPST NO	Side Stable	Form Z	24-30	Gasket/Vented	Int.	–	A-770RG	3-1616058-5
		28	SPST NO	Side Stable	Form Z SPST NC	24-30	Gasket/Vented	Cont.	45	A-770RN	3-1616058-8
		28	SPST NO	Side Stable	Form Z SST NC	24-30	Gasket/Vented	Cont.	45	A-770RSS	3-1616058-9
		28	SPST NO	Side Stable	Form Z	16-32	Gasket/Vented	Int.	80	A-770RV	1616530-7
		28	SPST NO	Side Stable	SPDT	28	Gasket/Vented	Cont.	–	A-770W	4-1616058-1
		28	SPST NO	Side Stable	2PST NO	28	Gasket/Vented	Int.	42	A-700WA-2	4-1616058-2
300	DC	28	SPST NO	Side Stable	DPST NO SPS NC	28	Gasket/Vented	Int.	–	A-770WA-3	4-1616058-3
		28	SPST NO	Side Stable	3PDT	28	Gasket/Vented	Cont.	42	A-770WF	4-1616058-4
		28	SPST NO	Side Stable	SPDT	115 VAC	Gasket/Vented	Cont.	–	AR-770W	0-1616063-1

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

**Cross Reference** (Continued)

Main Current Rating	AC/DC	Rating	Main Contact Config.	Operating Mode	Aux. Contact Config.	Coil Voltage (VDC)	Seal Type	Duty Cycle	Coil Trans. Voltage	Hartman Part No.	TE Part No.
300	DC	24/48	DPDT NC SPDT NO	Side Stable	SPST NO	24-30	Gasket/Vented	Int.	–	A-848KH	1616082-2
		24/48	DPST NC SPST NO	Side Stable	SPST NO	24-30	Gasket/Vented	Int.	–	A-848KH-2	1616082-4
		28	DPST NO	Side Stable	DPST NO DPST NC	28	Gasket/Vented	Cont.	45	A-848MAS	1616102-2
300	DC	28	DPST NO	Side Stable	3PST NC	24-30	Gasket/Vented	Cont. Econ.	50	A-848MLS	1616102-3
		28	DPST NO	Side Stable	3PST NC	24-30	Gasket/Vented	Cont. Econ.	50	A-848KLC	0-1616082-6
		30	SPDT	Side Stable	SPDT	30	Hermetic	Int.	–	AH-965H	1616084-1
		30	SPDT	Side Stable	3PDT	28	Hermetic	Cont.	45	AH-965M	1616084-2
		28	SPST NO	Side Stable	SPDT	28	Gasket/Vented	Int.	45	A-400A	1-1616530-6
		28	SPST NO	Side Stable	–	28	Gasket/Vented	Int.	45	A-400AA	1616056-2
		28	SPST NO	Side Stable	DPDT	28	Gasket/Vented	Cont.	45	A-400B	1616056-4
		28	SPST NO	Side Stable	(1)SPST NO (1)SPST NC	28	Environ.	Cont.	45	A-400D	1616056-5
		28	SPST NO	Side Stable	(1)SPST NO (1)SPST NC	28	Environ.	Cont.	45	A-400DB1	1-1616964-3
		28	SPST NO	Side Stable	SPDT	28	Gasket/Vented	Cont.	45	A-400DC	1616056-6
400	DC	28	SPST NO	Side Stable	DPST NO SPST NC	28	Gasket/Vented	Int.	45	A-400G	1616056-8
		28	SPST NO	Side Stable	DPST NO SPST NC	28	Gasket/Vented	Int.	45	A-400G2	6-1616949-1
		28	SPST NO	Side Stable	DPST NO DPST NC	28	Gasket/Vented	Int.	45	A-400L	1-1616530-5
		28	SPST NO	Side Stable	DPST NO SPST NC	28	Gasket/Vented	Cont/Int	45	A-400S	1616056-9
		28	SPST NO	Side Stable	SPDT	24-30	Gasket/Vented	Cont. Econ.	–	A-703	1616058-1
		28	SPST NO	Side Stable	–	24-30	Gasket/Vented	Int.	–	A-703CD	1616058-6
		36/40	SPST NO	Side Stable	SPST NO	24-30	Gasket/Vented	Int.	50	A-703CSM	1616058-7
		28	SPST NO	Side Stable	Form Z	24-30	Gasket/Vented	Int.	–	A-703D	1616058-8
		28	SPST NO	Side Stable	Form Z	18-31	Gasket/Vented	Int.	–	A-703DBH	1-1616058-0
		28	SPST NO	Side Stable	Form Z	24-30	Gasket/Vented	Cont. Econ.	–	A-703E	1-1616058-1
400	DC	28	SPST NO	Side Stable	Form Z SPST NC	24-30	Gasket/Vented	Int.	45	A-703FA	1-1616058-2
		28	SPST NO	Side Stable	Form Z SPST NC	24-30	Gasket/Vented	Int.	–	A-703FB	1-1616058-3
		28	SPST NO	Side Stable	Form Z SPST NC	24-30	Gasket/Vented	Int.	45	A-703FSS	1-1616058-4
		28	SPST NO	Side Stable	Form Z SPST NC	18-31	Gasket/Vented	Cont. Econ.	–	A-703G-1	1-1616058-5
		28	SPST NO	Side Stable	Form Z SPDT	18-31	Gasket/Vented	Cont. Econ.	–	A-703GC	1-1616058-6
		28	SPST NO	Side Stable	Form Z	24-30	Gasket/Vented	Int.	–	A-703B	1616058-3
		28	SPST NO	Side Stable	Form Z SPST NC	18-31	Gasket/Vented	Cont. Econ.	45	A-703GS	1-1616058-7
		28	SPST NO	Side Stable	Form Z	24-30	Gasket/Vented	Cont. Econ.	45	A-703R	1-1616058-9
		28	SPST NO	Side Stable	SPST NO SPST NC	24-30	Gasket/Vented	Int.	45	A-703T	2-1616058-0
		28	SPST NO	Side Stable	SPST NO Form Z	18-24	Gasket/Vented	Cont. Econ.	45	A-703ZS	1-1616058-2
28	SPST NO	Side Stable	1Form Z 1Form Y	18-31	Hermetic	Cont. Econ.	–	AH-703F	1616061-1		

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

**Cross Reference** (Continued)

Main Current Rating	AC/DC	Rating	Main Contact Config.	Operating Mode	Aux. Contact Config.	Coil Voltage (VDC)	Seal Type	Duty Cycle	Coil Trans. Voltage	Hartman Part No.	TE Part No.
400	DC	28	SPDT	Side Stable	Form Z	17-31	Gasket/Vented	Int.	45	A-981S	1616083-7
		28	1PST NO 1PST NC	Side Stable	3PDT	24-30	Gasket/Vented	Cont. Econ.	–	A-981P	1616083-6
500	DC	50	SPST NO	Side Stable	SPDT SPST NC	38	Gasket/Vented	Cont. Econ.	50	A-792SFS	1616101-2
		29	SPST NO	Side Stable	–	24-28	Gasket/Vented	Cont.	–	A-712AB	2-1616058-3
600	DC	29	SPST NO	Side Stable	–	24-28	Gasket/Vented	Int.	–	A-712AF	2-1616058-4
		29	SPST NO	Side Stable	–	24-28	Gasket/Vented	Cont.	–	A-712J	2-1616058-6
		29	SPST NO	Side Stable	SPST NO SPDT	24-28	Gasket/Vented	Cont.	–	A-712W	6-1616058-3
600	DC	28/48	DPDT	Side Stable	SPST NO	29	Gasket/Vented	Int.	–	A-882DL	1616102-6
		28	SPST NC	Side Stable	DPST NO	18-30	Gasket/Vented	Cont. Econ.	45	A-931F	1616060-1
		28	SPDT	Side Stable	SPST NO	28	Gasket/Vented	Cont.	–	A-981E	1616083-1
		28	SPST NO SPST NC	Side Stable	–	24-30	Gasket/Vented	Cont. Econ.	–	A-981K	1616083-2

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

## E-328-2 Series AC Low Voltage Warning Relay, 10 Amps, 28 Vdc Contacts

### Product Facts

- DPDT
- Gasket sealed

### Performance Data

#### Electrical Characteristics

- Relay/Relay Driver**  
**Contact Arrangement** — DPDT  
**Rated Operating Voltage** — 28 Vdc  
**Resistive Rating** — 10 Amps  
**Inductive Rating** — 5 Amps  
**Lamp Rating** — 1.5 Amps

#### Coil Characteristics

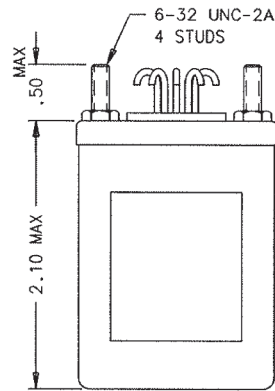
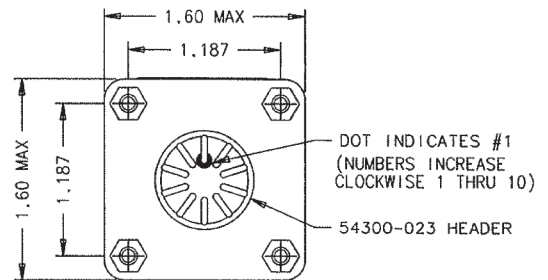
**Duty Cycle** — Continuous

#### Voltage Sensor

- Operating Voltage, Nom.** — 115 V, 380-420 Hz  
**Pickup Voltage** —  $107 \pm 3$  Vrms  
**Dropout Voltage** —  $100 \pm 2$  Vrms  
**Dropout Time, Min.** — 40 msec

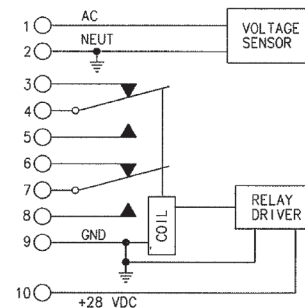
#### General Characteristics

- Temperature Range** —  $-55^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$   
**Operating Cycles (Life)**  
**Mechanical, Min.** — 100,000 cycles  
**Weight, Max.** — 6 oz.



Mounting Style A

**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1

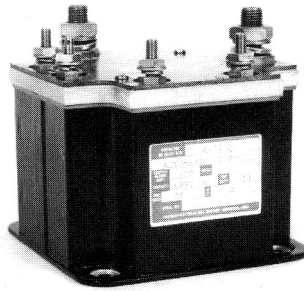
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
E-328-2	Gasket/Vented	A	Continuous	1	1-1616126-8

## A-772 Series Battery Contactor — Discharge Overload, Rated up to 200 Amps, 28 Vdc

### Product Facts

- SPST NO
- Gasket sealed
- Auxiliary contacts available
- Limits overload current duration



### Performance Data

#### Electrical Characteristics

- Main Contacts —**  
**Contact Arrangement —** SPST NO  
**Rated Operating Voltage —** 28 Vdc  
**Resistive Rating —** 200 Amps
- Auxiliary Contacts —**  
**Aux. Contact Arrangement —** SPST NC  
**Rated Operating Voltage —** 28 Vdc  
**Resistive Rating —** 5 Amps

#### General Characteristics

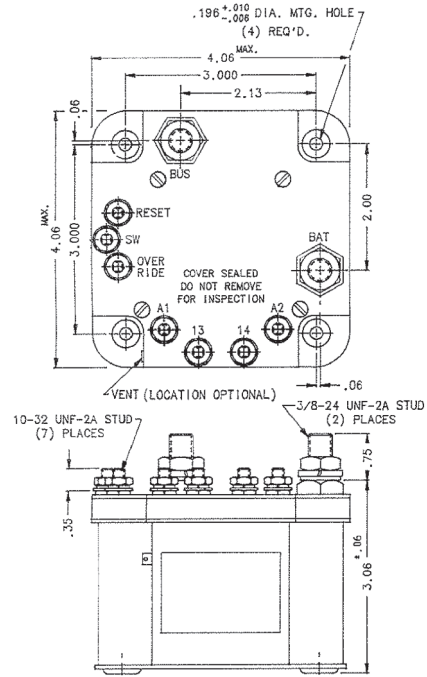
- Temperature Range —** -55°C to +71°C  
**Operating Cycles (Life) at Rated Resistive Load —** 50,000 cycles  
**Operating Cycles (Life) Mechanical —** 100,000 cycles  
**Electrical —** 50,000 min.  
**Weight, Max. —** 2 lbs. 13 oz.

#### Coil Characteristics

- Duty Cycle —** Continuous  
**Operating Voltage, Max. —** 30 V  
**Operating Voltage, Min. —** 24 V  
**Pickup Voltage @ 25°C, Max. —** 16 V  
**Dropout Voltage —** 1 to 7 V
- Overload Sensor**  
**Type —** Latching  
**Polarized —** Discharge  
**Trip —** 300 Amps ± 10%  
**Time Delay —** 900 to 1,100 msec

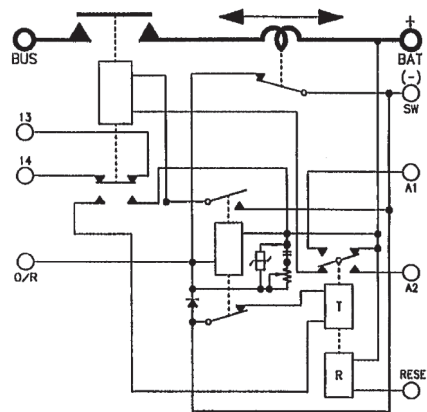
#### Sensor Contacts, Aux.

- Sensor Contact Arrangement —** SPST NO  
**Rated Operating Voltage —** 28 Vdc  
**Resistive Rating —** 3 Amps  
**Reset Rating, Max. —** 18 V



Mounting Style A

### Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

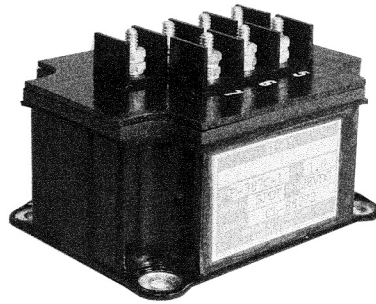
HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
A-772XTB	Gasket/Vented	A	Continuous	1	1616545-1



## E-387 Series Current Sensor, Rated up to 25 Amps, 28 Vdc

### Product Facts

- SPDT
- Gasket sealed
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

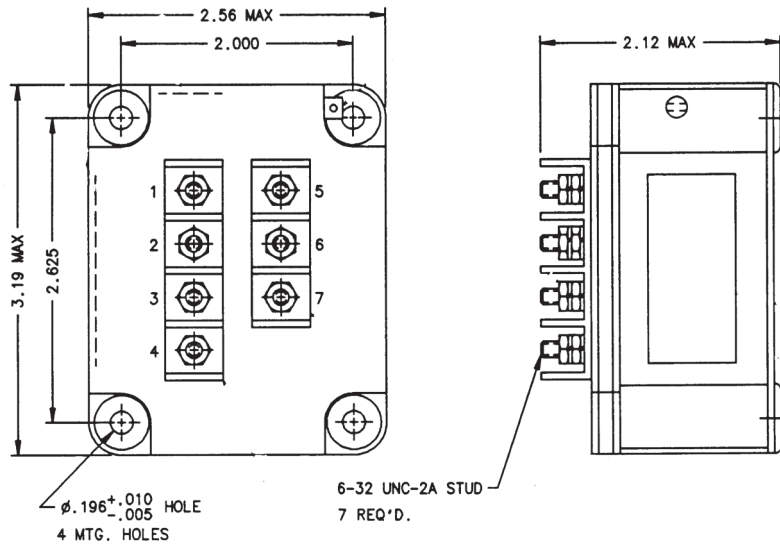
Indicator Contact Arrangement — SPDT  
 Rated Operating Voltage — 28 Vdc  
 Resistive Rating — 1 Amp

### General Characteristics

Dielectric Strength — 1,000 Vrms, 60 Hz  
 Insulation Resistance @ 500 Vdc & 20°C & 50% R.H. (Max.) — 1,000 megohm min.  
 Weight, Max. — 8 oz

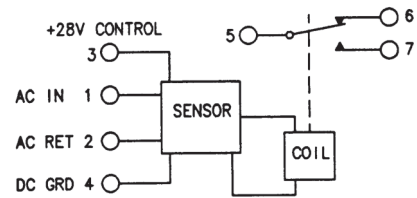
### Coil Characteristics

Duty Cycle — Continuous  
 Control Power — 28 Vdc  
 Sensor Input — 400 Hz ± 100 Hz  
 Pickup Current — 14 ± 2 Amps  
 Dropout Current — 7 ± 1 Amp  
 Continuous Sensor Current — 25 Amp, max.



Mounting Style A

**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1

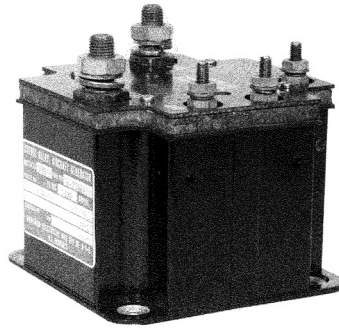
HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
E-387C-1	Gasket/Vented	A	Continuous	1	2-1616126-3

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

## A-700 Series Cutout — Reverse Current, Rated up to 100 Amps, 28 Vdc

### Product Facts

- SPST NO
- Gasket sealed
- Auxiliary contacts available



### Performance Data

#### Electrical Characteristics

- Main Contacts** —
- Contact Arrangement** — SPST NO
- Rated Operating Voltage** — 28 Vdc
- Resistive Rating** — 100 Amps
- Resistive Rating at 1 min.** — 200 Amps
- Interrupting Capacity** — 4,500 Amps

**Reverse Current Setting\*** — 2 to 6 Amps

**Differential Voltage for Pickup** —  $.85 \pm .15$  V

**Auxiliary Contacts** —

**Aux. Contact Arrangement** — SPST NC, SPST NO

**Resistive Rating** — 5 Amps

**Inductive Rating** — 2 Amps

**Lamp Rating** — 1 Amps

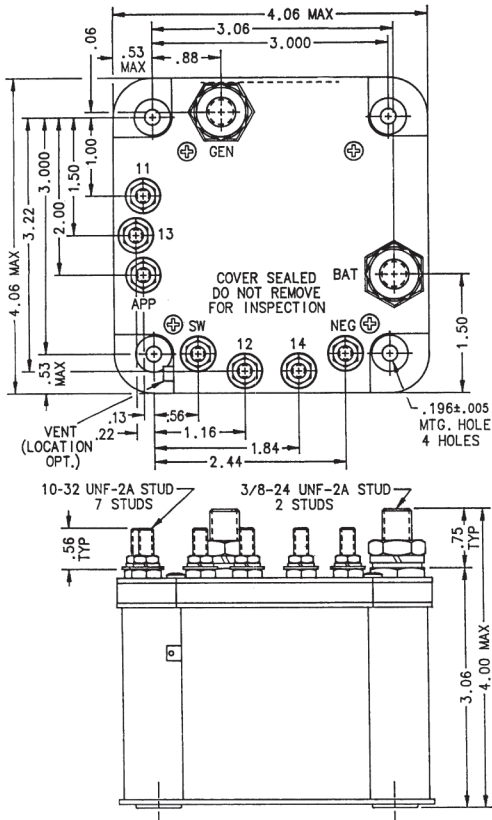
#### General Characteristics

**Weight, Max.** — 3 lbs 1 oz

#### Coil Characteristics

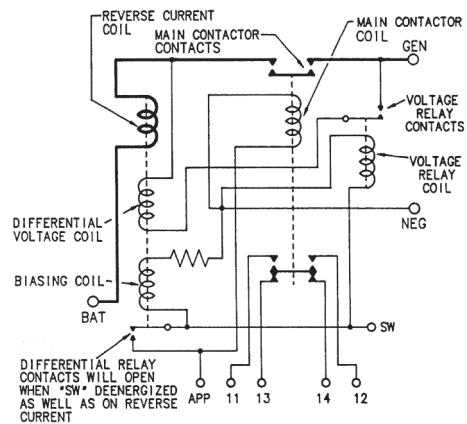
**Duty Cycle** — Continuous

\*Over a Voltage Range of  $27.5 \pm 2.5$  Vdc



Mounting Style A

### Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

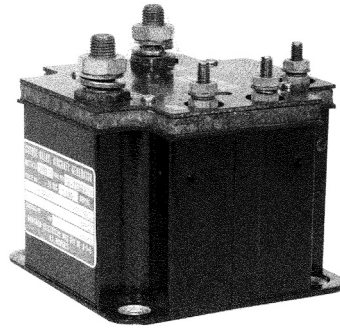
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
A-700BU	Gasket/Vented	A	Continuous	1	1616109-6

## A-700 Series Cutout — Reverse Current, Rated up to 200 Amps, 28 Vdc

### Product Facts

- SPST NO
- Gasket sealed
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

- Contact Arrangement** — SPST NO
- Rated Operating Voltage** — 28 Vdc
- Current Rating, Continuous** — 200 Amps
- Current Rating at 15 sec.** — 1,000 Amps
- Current Rating at 1 min.** — 500 Amps
- Current Rating at 5 min.** — 300 Amps
- Interrupting Capacity** — 4,500 Amps
- Reverse Current Setting\*** — 6 to 17 Amps
- Differential Voltage for Pickup** — .85 ± .15 V

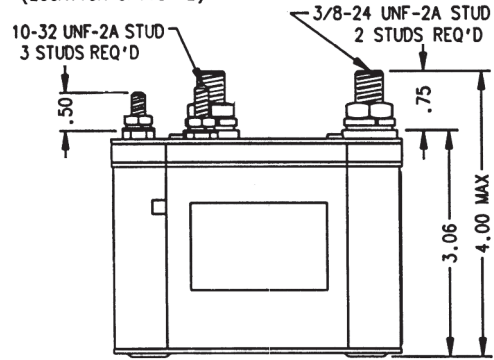
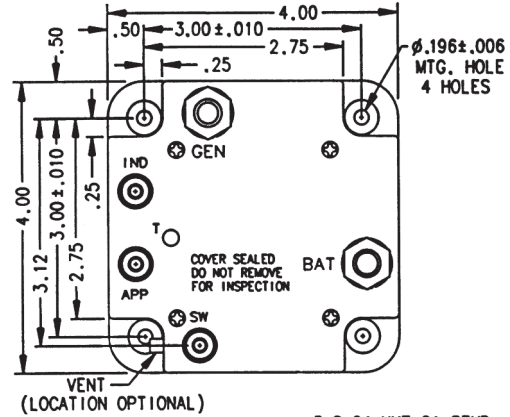
#### General Characteristics

- Temperature Range** — -55°C to +71°C
- Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles
- Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles
- Electrical** — 50,000 min.
- Weight, Max.** — 2 lbs 15 oz

#### Coil Characteristics

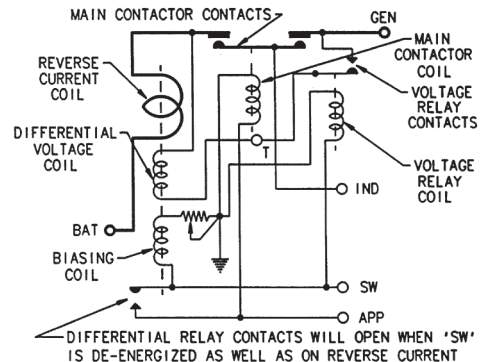
- Duty Cycle** — Continuous

\*Over a Voltage Range of 27.5 ± 2.5 Vdc and Calibrated at 12 ± 1 Amp RC at 28 Vdc & 25°C ± 5°C



Mounting Style A

### Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

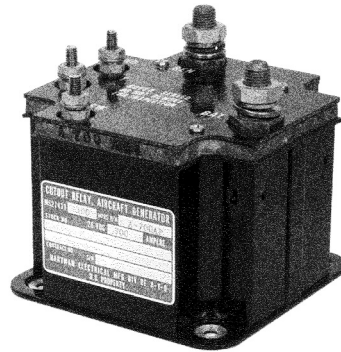
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
A-700AQ-4	Gasket/Vented	A	Continuous	1	1616109-4

## A-700 Series Cutout — Reverse Current, Rated up to 300 Amps, 28 Vdc

### Product Facts

- SPST NO, Double break
- Gasket sealed
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

- Contact Arrangement** — SPST NO, Double Break
- Rated Operating Voltage** — 28 Vdc
- Resistive Rating** — 300 Amps
- Reverse Current Dropout** — 9 to 25 Amps
- Differential Pickup** —  $.5 \pm .15$

#### General Characteristics

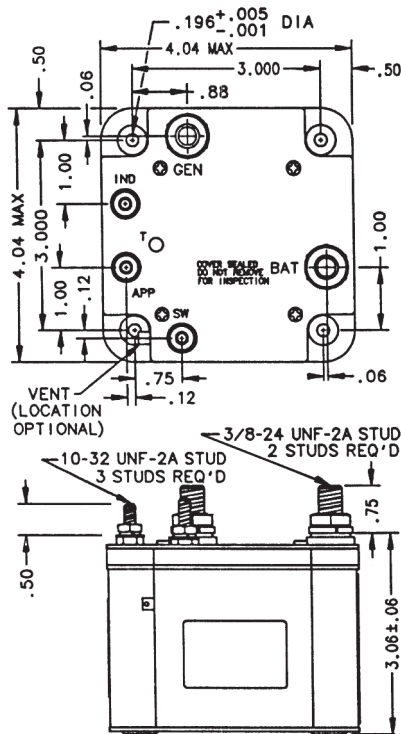
- Temperature Range** —  $-55^{\circ}\text{C}$  to  $+71^{\circ}\text{C}$
- Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles
- Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles
- Electrical** — 50,000 min.
- Dielectric Strength** — All Circuits to Ground — 1,250 Vrms  
Circuit to Circuit — 1,250 Vrms  
Coil to Ground and Aux. Contacts — 500 Vrms

#### Weight, Max. —

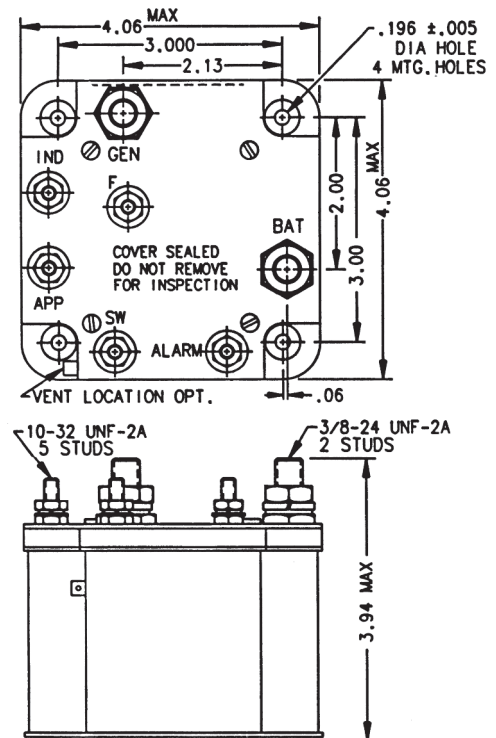
- A-700AAP — 2.9 lbs
- A-700ZC-7, A-700ZG — 2.5 lbs

#### Coil Characteristics

- Duty Cycle** — Continuous
- Duty Cycle when using "APP"** — Intermittent
- Nom. Coil Voltage** — 24 to 30 Vdc
- Pickup Voltage, Max.** — 18 Vdc
- Dropout Voltage** — 0.5 to 7.0 Vdc



Mounting Style A

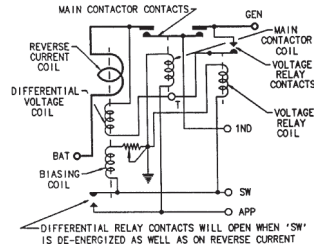


Mounting Style B

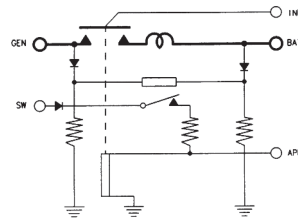
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

## A-700 Series Cutout — Reverse Current, Rated up to 300 Amps, 28 Vdc (Continued)

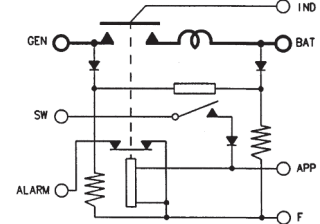
**Circuit Configurations** (Consult factory for other available circuit configurations)



**Circuit Configuration 1**



**Circuit Configuration 2**



**Circuit Configuration 3**

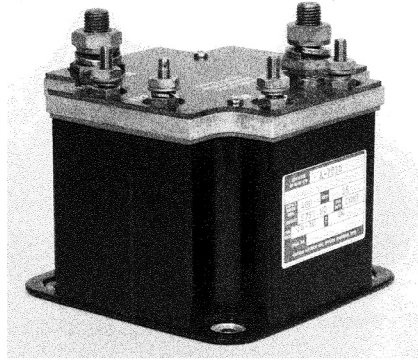
HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
A-700AAP	Gasket/Vented	A	Continuous	1	1616109-1
A-700ZC-7	Gasket/Vented	A	Continuous	2	1616109-7
A-700ZG	Gasket/Vented	B	Continuous	3	1616109-9

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

## A-701 Series Cutout — Reverse Current, Rated up to 400 Amps, 28 Vdc

### Product Facts

- SPST NO, Double break
- Gasket sealed
- Meets many requirements of MIL-C-5026 and MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

**Contact Arrangement** — SPST NO, Double Break  
**Rated Operating Voltage** — 28 Vdc  
**Resistive Rating** — 400 Amps  
**Resistive for 30 sec.** — 1,000 Amps  
**Inrush Rating** — 1,500 Amps  
**Reverse Current Dropout** —  
 A-701D — 25 to 50 Amps  
 A-701C — 18 to 35 Amps

### General Characteristics

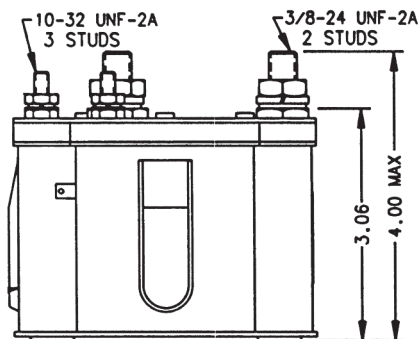
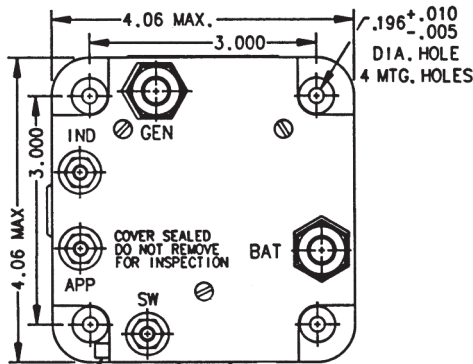
**Temperature Range** —  
 -55°C to +71°C  
**Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles  
**Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles  
**Electrical** — 50,000 min.  
**Dielectric Strength** —  
 All Circuits to Ground — 1,250 Vrms  
 Circuit to Circuit — 1,250 Vrms  
 Coil to Ground and Aux. Contacts — 500 Vrms  
**Differential Pickup** — 0.5 ± .15 Vdc

### Weight, Max. —

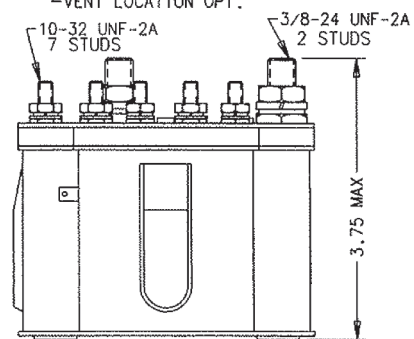
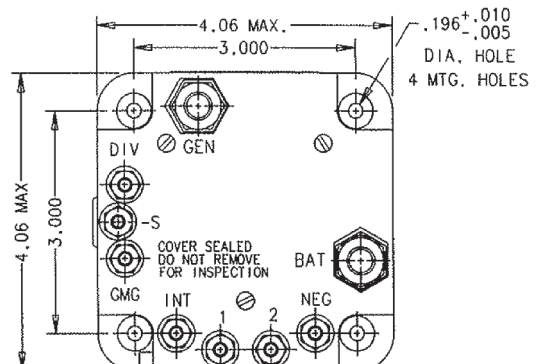
A-701D — 3 lbs 10 oz  
 A-701C — 4 lbs

### Coil Characteristics

**Duty Cycle** — Continuous, economizing  
**Duty Cycle when using “APP” on A-701D or “GMG” on A-701C** — Intermittent  
**Nom. Coil Voltage** — 24 to 30 Vdc  
**Pickup Voltage, Max.** —  
 A-701D — 15 Vdc  
 A-701C — 12 Vdc  
**Dropout Voltage** — 0.5 to 7.0 Vdc



Mounting Style A

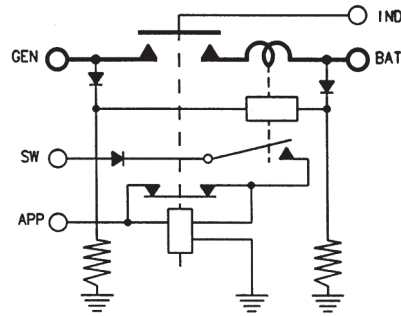


Mounting Style B

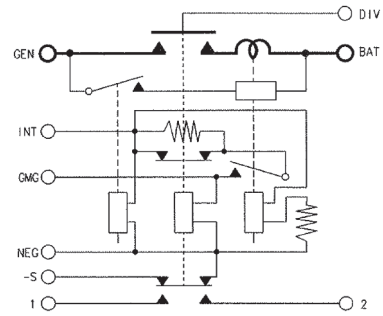
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

## A-701 Series Cutout — Reverse Current, Rated up to 400 Amps, 28 Vdc (Continued)

**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 2

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
A-701D	Gasket/Vented	A	Continuous, Economizing	1	1-1616109-1
A-701C	Gasket/Vented	B	Continuous, Economizing	2	1-1616109-0

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

## A-702 Series Cutout — Reverse Current, Rated up to 600 Amps, 28 Vdc

### Product Facts

- SPST NO
- Gasket sealed

### Performance Data

#### Electrical Characteristics

- Contact Arrangement** — SPST NO, Double Break
- Rated Operating Voltage** — 28 Vdc
- Resistive Rating** — 600 Amps
- Reverse Current Dropout** — 18 to 35 Amps
- Differential Pickup** —  $.5 \pm .15$

#### General Characteristics

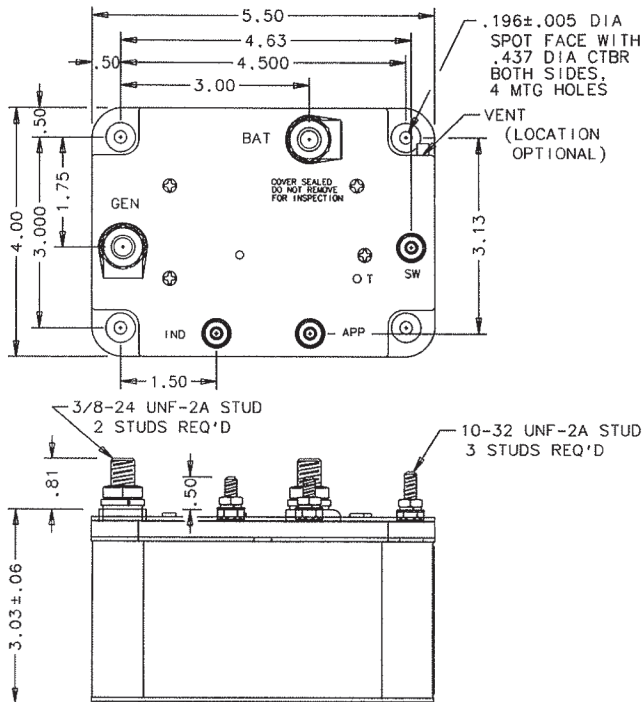
- Temperature Range** —  $-55^{\circ}\text{C}$  to  $+71^{\circ}\text{C}$
- Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles
- Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles
- Electrical** — 50,000 min.
- Dielectric Strength** — All Circuits to Ground — 1,250 Vrms  
Circuit to Circuit — 1,250 Vrms

Coil to Ground and Aux. Contacts — 500 Vrms

**Weight, Max.** — 3.9 lbs.

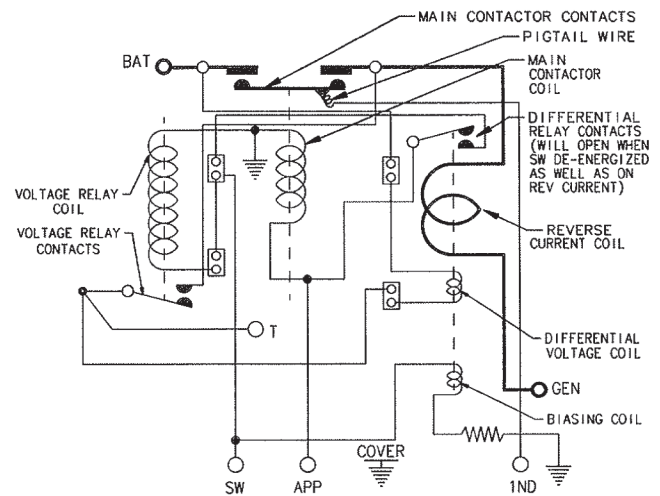
#### Coil Characteristics

- Duty Cycle** — Continuous
- Duty Cycle when using "APP"** — Continuous
- Nom. Coil Voltage** — 24 to 30 Vdc
- Pickup Voltage, Max.** — 18 Vdc
- Dropout Voltage** — 0.5 to 7.0 Vdc



Mounting Style A

### Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
A-702AAP	Gasket/Vented	A	Continuous	1	1-1616109-3



## B-188 Series External Power Monitor, 115 VAC, 400 Hz

### Product Facts

- SPST
- Gasket Sealed
- Over/under frequency protection
- Over/under voltage protection
- Dust tight



### Performance Data

#### Electrical Characteristics

**Contact Arrangement** — SPST

**Rated Operating Voltage** — 115 VAC/28 Vdc, 3 phase, 400 Hz

**Resistive Rating** — 3 Amps

#### General Characteristics

**Operating Temperature Range** — -54°C to +71°C

**Dielectric Strength** — Leakage current will not exceed .001 Amps when unit is subjected to test of Para. 4.6.2 of MIL-E-24021A

**Altitude** — 0-40,000 ft

**Weight, Max.** — .75 lb

**Sinusoidal Vibration** —

5-15.5 CPS  $\pm 0.13$  G,  
15.5-54 CPS 0.01 inch DA,  
54-500 CPS  $\pm 1.5$  G

**Shock, Max.** — 10 G 30  $\pm 1$  ms

**Operation** — Contacts will remain as shown (off condition) until input power is anywhere within the “on” zone. Contacts will revert to off condition whenever input voltage and/or frequency is above the high side or below the low side “off”. Limits for time intervals exceeding the transient period.

#### Limits

“On” zone —

“On” zone voltage limits 100 to 120 volts rms all phases

“On” zone frequency limits 380 to 420 CPS

“Off” limits —

High side voltage “off” limits — 131  $\pm 5$  volts 3  $\emptyset$  (highest of 3 $\emptyset$ )

High side frequency “off” limits — 425  $\pm 5$  CPS

Low side frequency “off” limits — 375  $\pm 5$  CPS

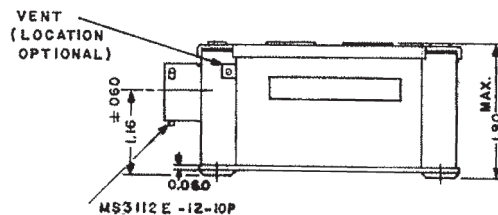
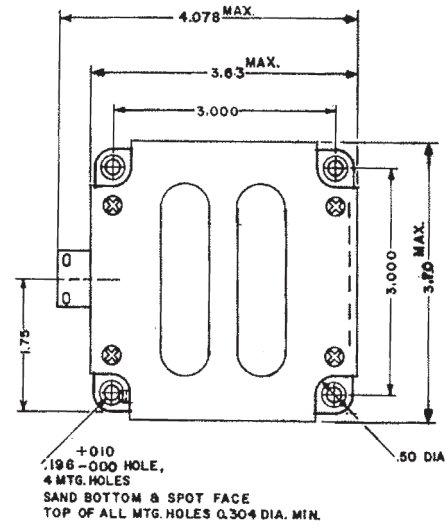
Voltage Transient Limits —

High Side — above limit 2 but below limit 1 of Fig. 2 MIL-STD-704, 3 $\emptyset$  (highest of 3 $\emptyset$ )

Low Side — below limit 3 Fig. 2 MIL-STD-704

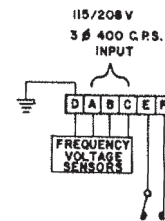
Over and Under frequency time delay 3  $\pm 1$  sec.

Output rating SPST 3 AMP Ind. 28 V DC/115 V 400 CPS



Mounting Style A

**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
B-188MA-1	Gasket/Vented	A	N/A	1	1616114-7

## A-711 Series Relay, Automatic Dropout, Rated up to 600 Amps, 29 Vdc

### Product Facts

- SPST NO, Double break
- Gasket sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

**Contact Arrangement** — SPST NO, Double Break  
**Operating Voltage, Max.** — 29 Vdc  
**Resistive Rating** — 600 Amps  
**Pickup Voltage, Max.** — 17 Vdc  
**Dropout Voltage, Max.** — 14 Vdc, except for A-711 which is 1 to 5 Vdc  
**Pickup Current, Max.** — 490 Amps  
**Dropout Current at any Contactor Voltage** — 150 ± 15 Amps, except for A-711R which is S1 — 135 ± 15 Amps and S2 — 235 ± 20 Amps

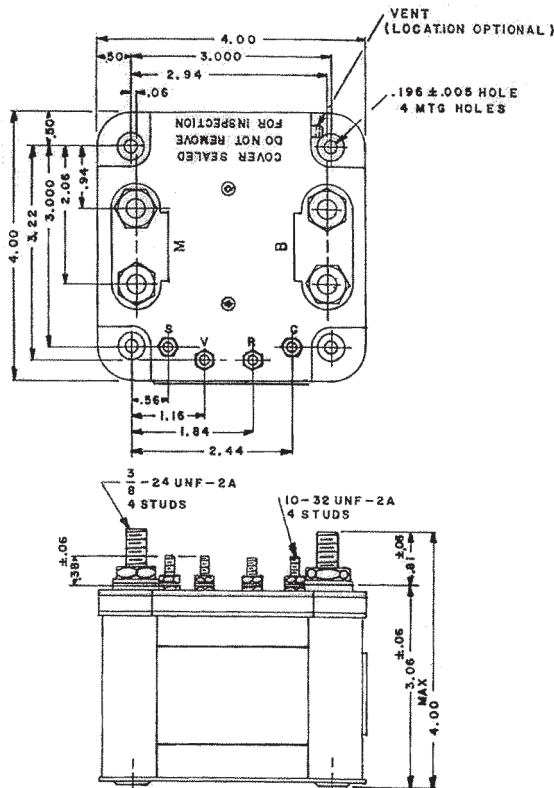
#### General Characteristics

**Temperature Range** — -55°C to +71°C  
**Operating Cycles (Life) at Rated Resistive Load, Min.** — 25,000 cycles  
**Operating Period, Max.** — 3 min.  
**Weight, Max.** —  
 A-711JF, A-711JF — 3 lbs 13 oz  
 A-711Z — 3 lbs 6 oz  
 A-711R — 3 lbs 5 oz

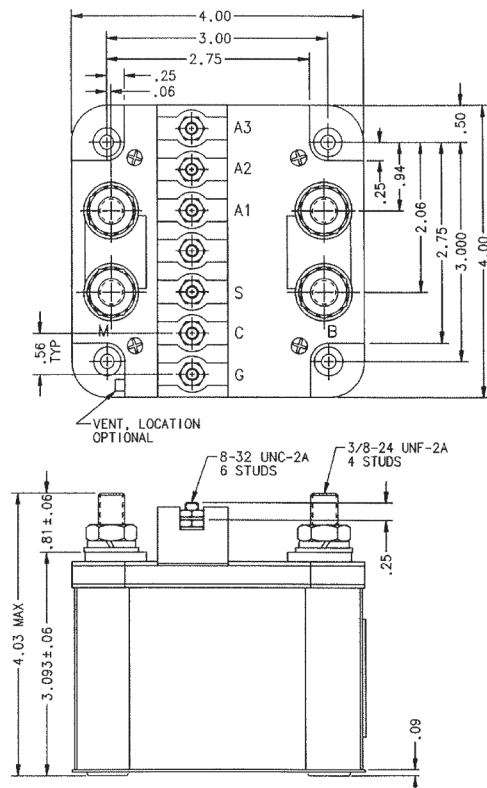
#### Coil Characteristics

**Duty Cycle** — Intermittent  
**Coil Current, Max.** —  
 A-711AJ, A-711JM — 2 Amps  
 A-711Z — 0.6 Amp  
 A-711R — 1.0 Amp  
**Coil Voltage, Nom.** — 28 Vdc  
**Signal Resistor** — 20 Ohm ± 10%, 20 W  
**Coil Res., "C" Term. to "GND"** — 36 Ohm ± 10%

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



Mounting Style A

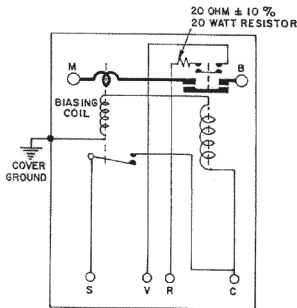


Mounting Style B

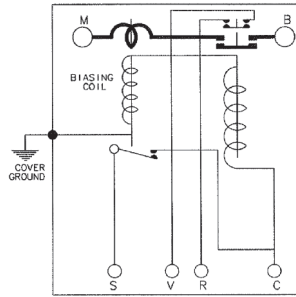
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

## A-711 Series Relay, Automatic Dropout, Rated up to 600 Amps, 29 Vdc (Continued)

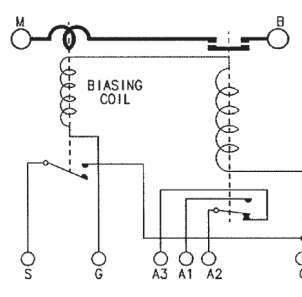
**Circuit Configurations** (Consult factory for other available circuit configurations)



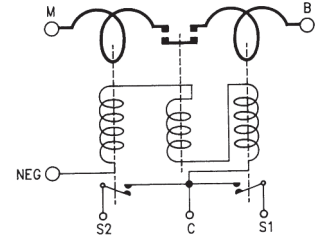
Circuit Configuration 1



Circuit Configuration 2



Circuit Configuration 3



Circuit Configuration 4

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
A-711JF	Gasket/Vented	A	Intermittent	1	1-1616109-6
A-711JM	Gasket/Vented	A	Intermittent	2	1-1616109-7
A-711Z	Gasket/Vented	B	Intermittent	3	6-1616071-3
A-711R	Gasket/Vented	A	Intermittent	4	1-1616109-8

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

## A-957 Series Relay, Automatic Cutout, Rated up to 200 Amps, 28 Vdc

### Product Facts

- SPST NO, Double break
- Gasket sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106

### Performance Data

#### Electrical Characteristics

##### Main Contacts —

**Contact Arrangement** — SPST NO, Double Break

**Operating Voltage, Nom.** — 28 Vdc

**Resistive Rating** — 200 Amps

**Inrush Rating** — 300 Amps

**Pickup Current** —

VR — 21-24 V

I — 25 Amp Max.

SR — 18 V Max.

MC — 18 V Max.

**Dropout Current** —

I — 5 Amp Min.

SR — 18 ± 3 V

MC — 1 to 7 V

**Auxiliary Contacts** —

**Aux. Contact Arrangement** — SPST NO, SPST NC

**Rated Operating Voltage** — 28 Vdc

**Resistive Rating** — 5 Amps

#### General Characteristics

**Temperature Range** — -55°C to +71°C

**Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles

**Operating Cycles (Life) Mechanical** — 100,000 cycles

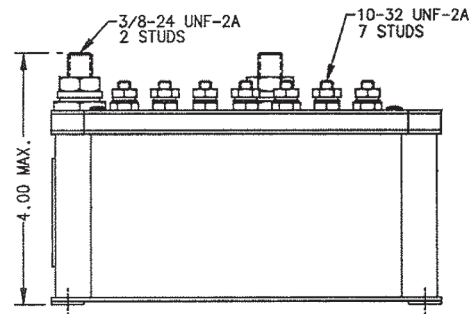
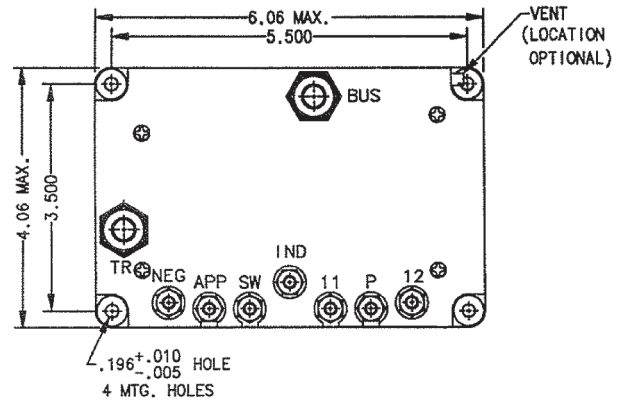
**Altitude, Max.** — 50,000 ft

**Weight, Max.** — 4 lbs 8 oz

#### Coil Characteristics

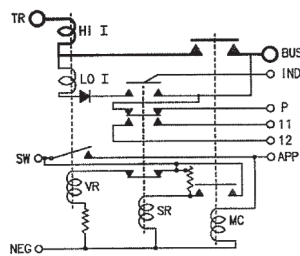
**Duty Cycle** — Continuous

**Coil Voltage, Nom.** — 24 to 30 Vdc

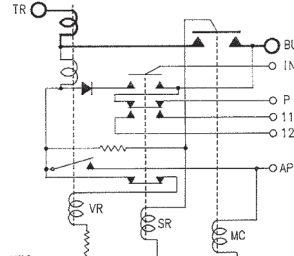


Mounting Style A

### Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 2

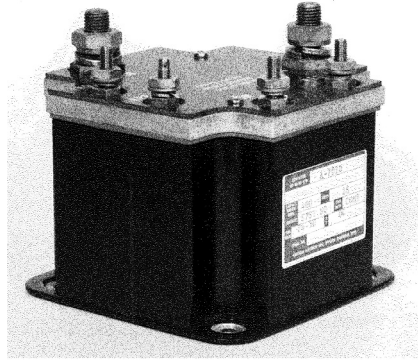
HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
A-957CSD	Gasket/Vented	A	Continuous	1	1616110-6
A-957G	Gasket/Vented	A	Continuous	2	1616110-8

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

## A-957 Series Relay, Automatic Cutout, Rated up to 300 Amps, 24/30 Vdc

### Product Facts

- SPST NO, Double break
- Gasket sealed
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

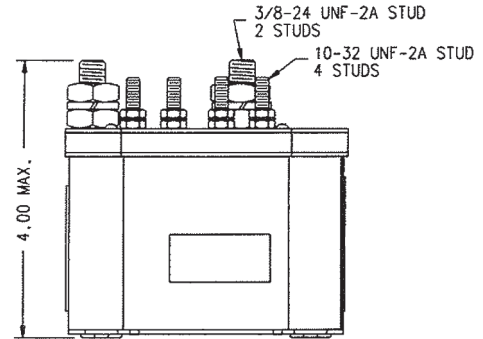
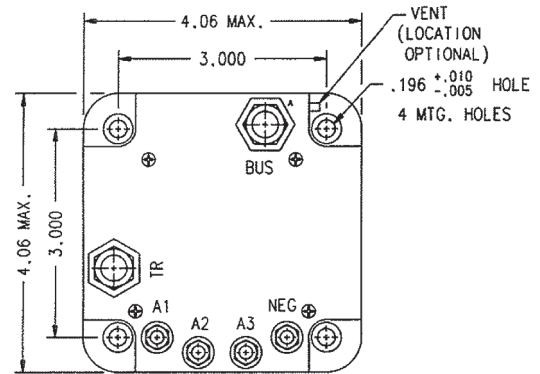
- Contact Arrangement** — SPST NO, Double Break
- Operating Voltage, Nom.** — 24/30 Vdc
- Resistive Rating** — 300 Amps
- Inrush Rating** — 800 Amps
- Pickup Current** —  
 VR — 21-24 Vdc  
 Current — 25 Amp Max.  
 SR — 18 V Max.  
 Main Contactor — 18 V Max.
- Dropout Current** —  
 Current — 5 Amp Min.  
 SR — 18 ± 3 V  
 Main Contactor — 12 V Max.

#### General Characteristics

- Temperature Range** — -55°C to +71°C
- Operating Cycles (Life) at Rated Resistive Load, Min.** — 50,000 cycles
- Operating Cycles (Life) Mechanical** — 100,000 cycles
- Weight, Max.** — 3.5 lbs

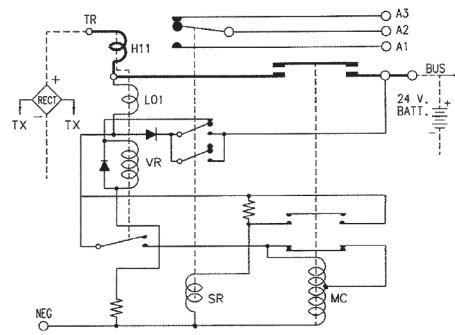
#### Coil Characteristics

- Duty Cycle** — Continuous
- Coil Voltage, Nom.** — 24 to 30 Vdc



Mounting Style A

### Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
A-957E	Gasket/Vented	A	Continuous	1	1616110-7

## A-957 Series Relay, Automatic Cutout, Rated up to 350 Amps, 28 Vdc

### Product Facts

- SPST NO, Double break
- Gasket sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106

### Performance Data

#### Electrical Characteristics

**Main Contacts —**  
**Contact Arrangement —** SPST NO, Double Break  
**Operating Voltage, Nom. —** 28 Vdc  
**Resistive Rating —** 350 Amps  
**Pickup Current —**  
 VR — 21-24 V  
 I — 25 Amp Max.  
 SR — 18 V Max.  
 MC — 18 V Max.

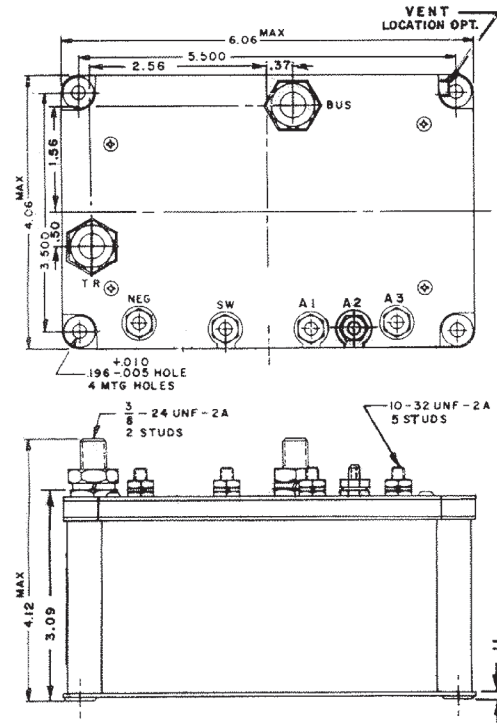
**Dropout Current —**  
 I — 5 Amp Min.  
 SR — 18 ± 3 V  
 MC — 1 to 7 V

**Auxiliary Contacts —**  
**Aux. Contact Arrangement —** SPDT  
**Rated Operating Voltage —** 28 Vdc  
**Resistive Rating —** 5 Amps

**General Characteristics**  
**Ambient Temperature Range —** -30°F to +220°F

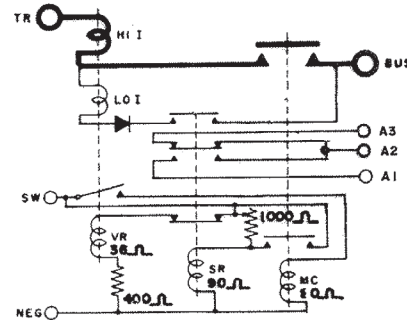
**Altitude, Max. —** 50,000 ft  
**Weight, Max. —** 4 lbs 8 oz

**Coil Characteristics**  
**Duty Cycle —** Continuous  
**Coil Voltage, Nom. —** 24 to 30 Vdc



Mounting Style A

### Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

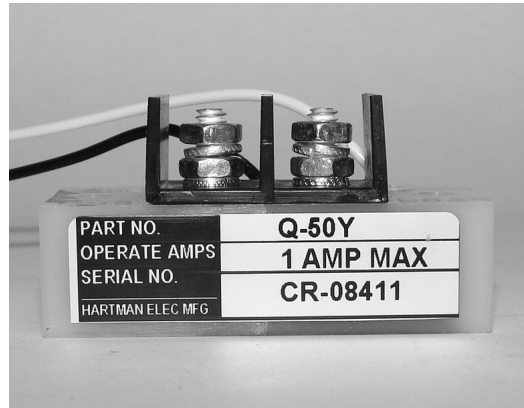
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
A-957CA	Gasket/Vented	A	Continuous	1	1616110-5

## Q-50 Series Relay, Current Indicator, Rated up to 2 Amps, 28 Vdc

### Product Facts

- SPST NC
- Environmentally sealed
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

Contact Arrangement — SPST NC

Contact Rating @ 120 Vdc — 0.1 Amp

Rated Operating Voltage — 28 Vdc

Sensing Current Rating — 2 Amps, continuous

Pickup Max. — 1 Amp DC

Dropout Min. — 0.4 Amp

Operating Voltage, Nom. — 28 Vdc

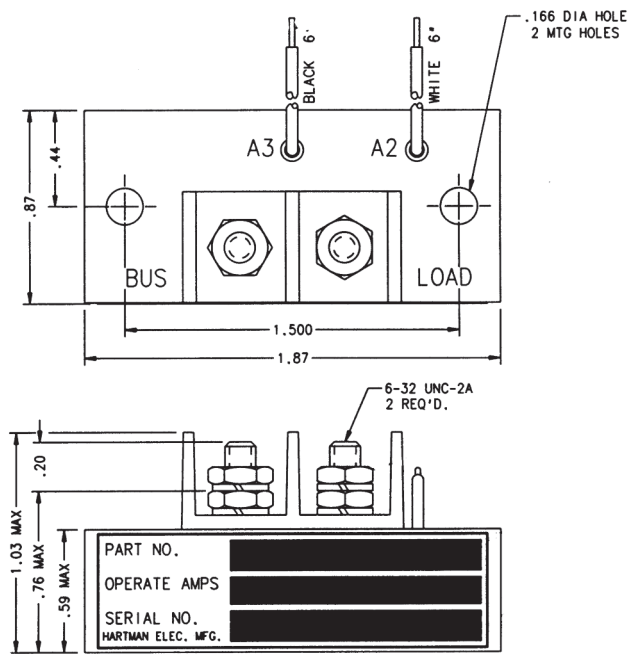
#### General Characteristics

Temperature Range —

-55°C to +71°C

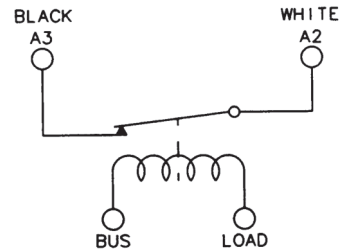
Altitude, Max. — 50,000 ft

Weight, Max. — 1.25 oz



Mounting Style A

### Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

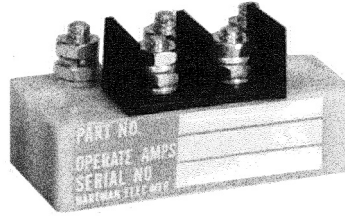
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

HARTMAN Part Number	Construction Type	Mounting Style	Duty Cycle	Circuit Config.	TE Part Number
Q-50Y	Environmentally Sealed	A	Continuous	1	1-1616131-2

## Q-50 Series Relay, Current Indicator, Rated up to 3.5 Amps, 28 Vdc

### Product Facts

- SPDT
- Environmentally sealed
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

**Contact Arrangement** — SPDT

**Contact Rating @ 28 Vdc** — 0.25 Amp

**Lamp Load @ 28 Vdc** — 0.080 Amp

**Rated Operating Voltage** — 28 Vdc

**Sensing Current Rating** — 3.5 Amps, continuous

**Pickup Max.** — 2 Amp DC

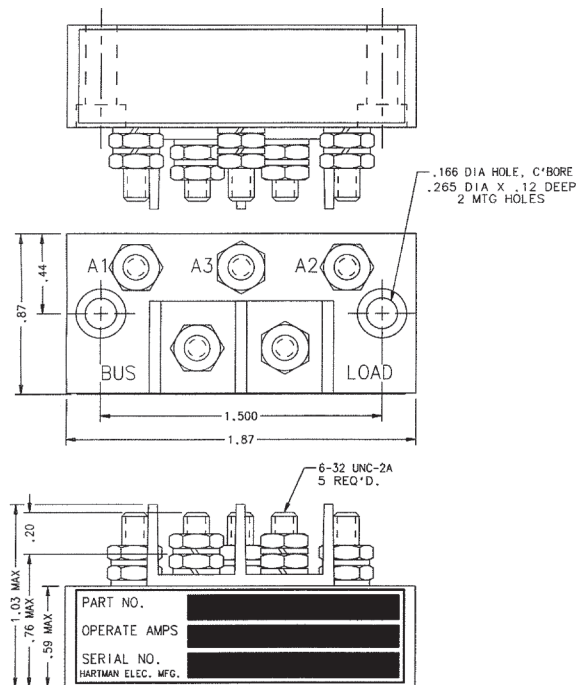
**Dropout Min.** — 0.8 Amp

#### General Characteristics

**Temperature Range** — -55°C to +71°C

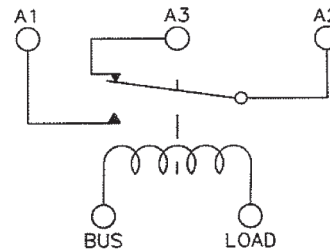
**Altitude, Max.** — 50,000 ft

**Weight, Max.** — 1.25 oz



Mounting Style A

### Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

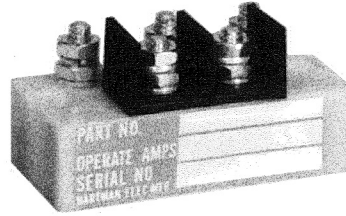
HARTMAN Part Number	Construction Type	Mounting Style	Duty Cycle	Circuit Config.	TE Part Number
Q-50F	Environmentally Sealed	A	Continuous	1	1616131-9



## Q-50 Series Relay, Current Indicator, Rated up to 6.25 Amps, 28 Vdc

### Product Facts

- SPDT
- Environmentally sealed
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

**Contact Arrangement** — SPST NC

**Contact Rating @ 28 Vdc** — 0.25 Amp

**Rated Operating Voltage** — 28 Vdc

**Sensing Current Rating** — 6.25 Amps, continuous

**Lamp Load** — 0.080 Amp

#### Pickup Max. —

Q50BB - 2.5 Amps DC

Q50BD - 2.0 Amps DC

Q50E - 3.5 Amps DC

#### Dropout Min. —

Q50BD - 0.8 Amps DC

Q50BB - 1.0 Amps DC

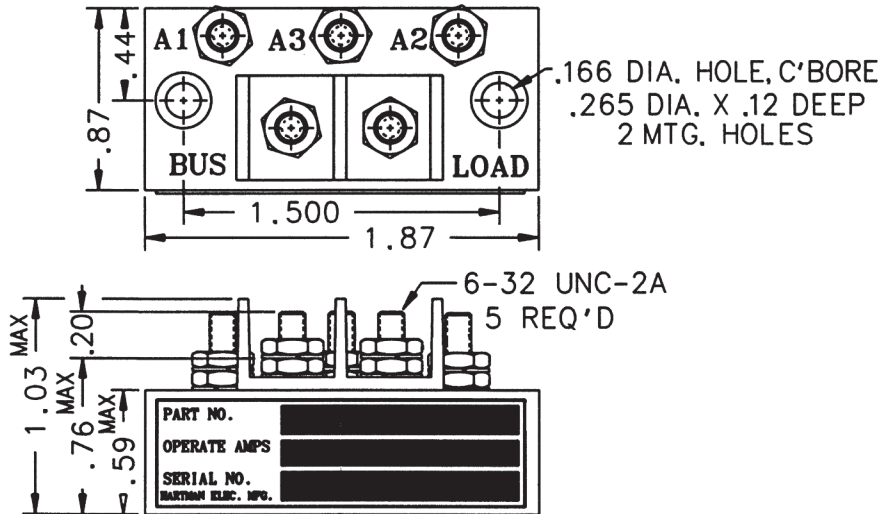
Q50E - 1.4 Amps DC

### General Characteristics

**Temperature Range** — -55°C to +71°C

**Altitude, Max.** — 50,000 ft

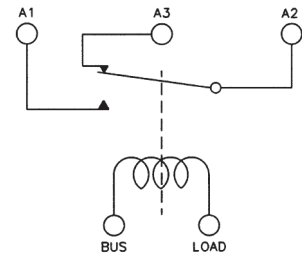
**Weight, Max.** — 1.25 oz



Mounting Style A

### Circuit Configurations

(Consult factory for other available circuit configurations)



Circuit Configuration 1

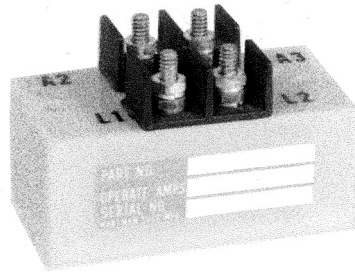
HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
Q-50BB	Environmentally Sealed	A	Continuous	1	1616131-5
Q-50E	Environmentally Sealed	A	Continuous	1	1616131-8
Q-50BD	Environmentally Sealed	A	Continuous	1	1616131-6

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

**Q-50 Series Relay, Current Indicator, Rated up to 10 Amps, 28 Vdc**

**Product Facts**

- SPST NO
- Environmentally sealed
- Meets many requirements of MIL-PRF-6106



**Performance Data**

**Electrical Characteristics**

**Contact Arrangement** — SPST NO

**Contact Rating @ 28 Vdc** — 0.25 Amp

**Lamp Load @ 28 Vdc** — 0.08 Amp

**Rated Operating Voltage** — 28 Vdc

**Sensing Current Rating** — 20 Amps, continuous, max.

**Pickup Max.** — 3.5 Amps DC

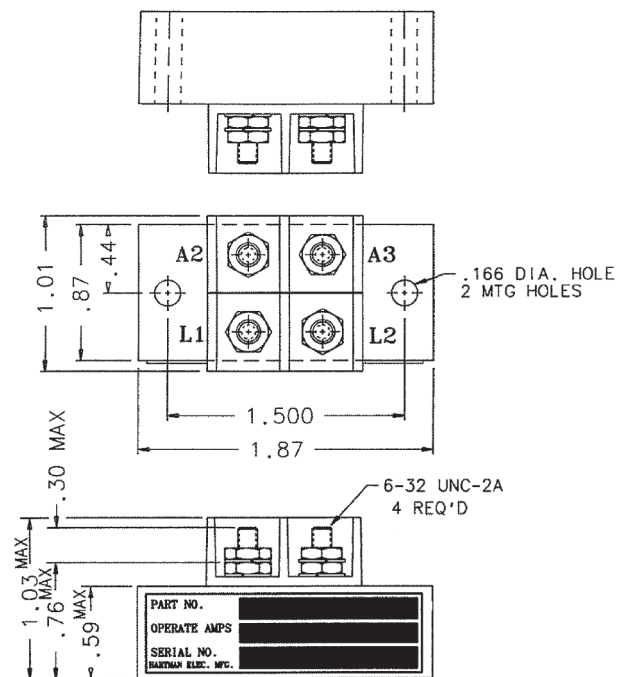
**Dropout Min.** — 0.5 Amp

**General Characteristics**

**Temperature Range** — -55°C to +71°C

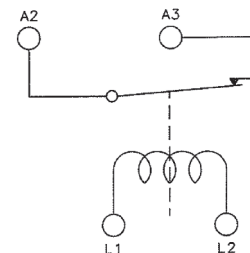
**Altitude, Max.** — 50,000 ft

**Weight, Max.** — 1.25 oz



**Mounting Style A**

**Circuit Configurations** (Consult factory for other available circuit configurations)



**Circuit Configuration 1**

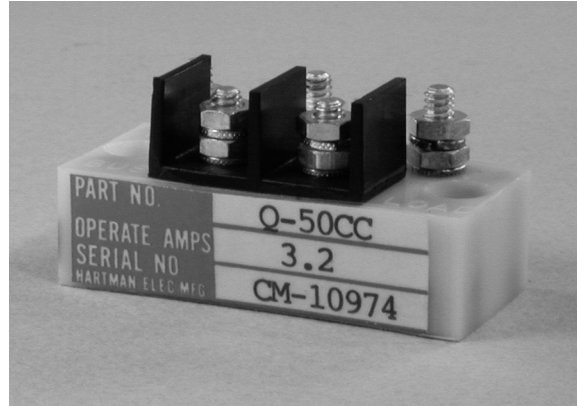
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

HARTMAN Part Number	Construction Type	Mounting Style	Duty Cycle	Circuit Config.	TE Part Number
Q-50A	Environmentally Sealed	A	Continuous	1	1616131-1

**Q-50 Series Relay, Current Indicator, Rated up to 15 Amps, 28 Vdc**

**Product Facts**

- SPDT
- Environmentally sealed
- Meets many requirements of MIL-PRF-6106



**Performance Data**

**Electrical Characteristics**

**Contact Arrangement** — SPDT

**Contact Rating @ 28 Vdc** — 0.25 Amp

**Lamp Load @ 28 Vdc** — 0.10 Amp

**Rated Operating Voltage** — 28 Vdc

**Sensing Current Rating** — 15 Amps DC, continuous, max.

**Pickup Max.** — 3.2 Amps DC

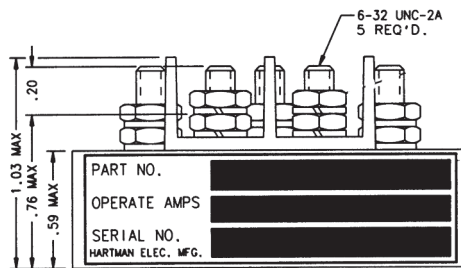
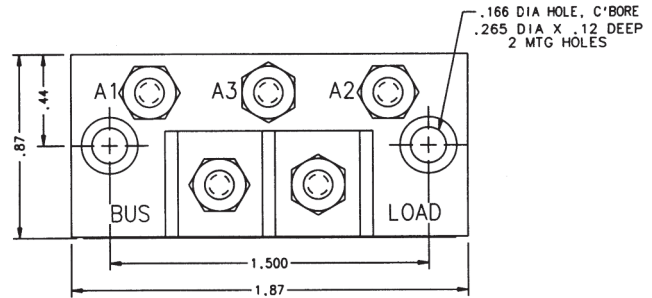
**Dropout Min.** — 1.2 Amps

**General Characteristics**

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

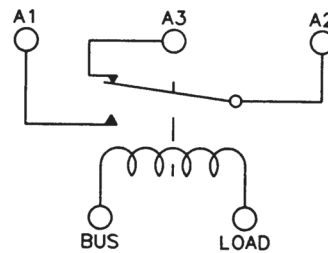
**Altitude, Max.** — 50,000 ft

**Weight, Max.** — 1.25 oz



Mounting Style A

**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1

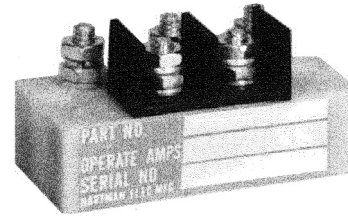
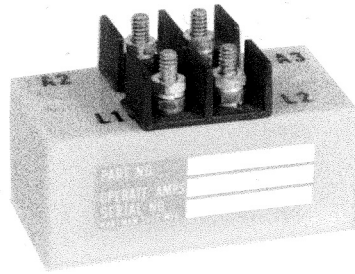
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

HARTMAN Part Number	Construction Type	Mounting Style	Duty Cycle	Circuit Config.	TE Part Number
Q-50CC	Environmentally Sealed	A	Continuous	1	1616131-7

## Q-50 Series Relay, Current Indicator, Rated up to 16 Amps, 28 Vdc

### Product Facts

- SPST NC
- Environmentally sealed
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

##### Contact Arrangement —

Q50S - SPST NC

Q50Z - SPDT

##### Contact Rating @ 28 Vdc —

0.25 Amp

##### Lamp Load @ 28 Vdc —

0.10 Amp

##### Rated Operating Voltage — 28 Vdc

**Sensing Current Rating** — 16 Amps  
DC, continuous, max.

**Pickup Max.** — 3 Amps DC

**Dropout Min.** — 1.2 Amps

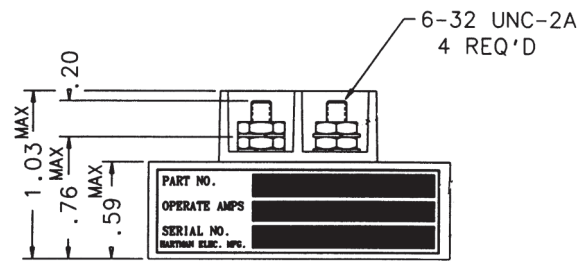
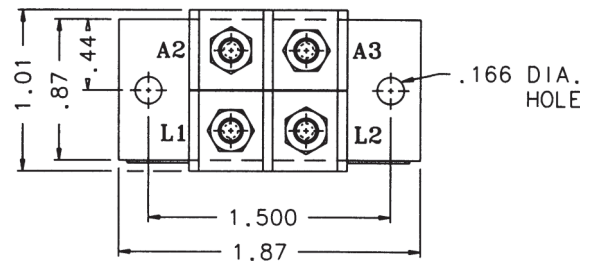
#### General Characteristics

##### Temperature Range —

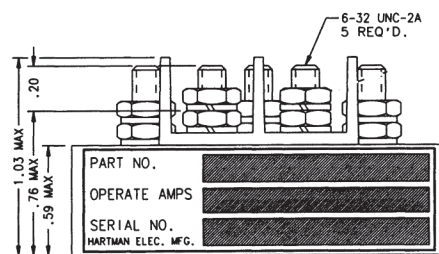
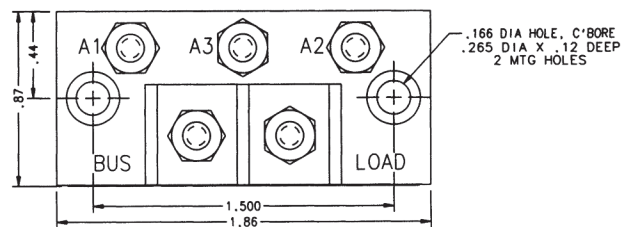
-55°C to +71°C

**Altitude, Max.** — 50,000 ft

**Weight, Max.** — 1.25 oz

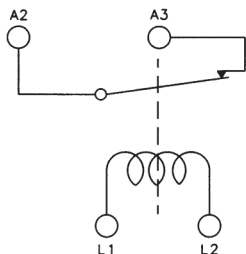


Mounting Style A

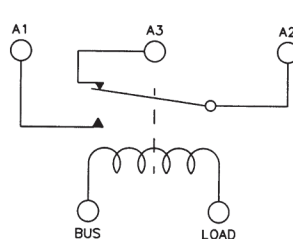


Mounting Style B

### Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 1

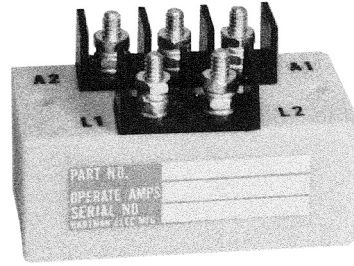
HARTMAN Part Number	Construction Type	Mounting Style	Duty Cycle	Circuit Config.	TE Part Number
Q-50S	Environmentally Sealed	A	Continuous	1	1-1616131-1
Q-50Z	Environmentally Sealed	A	Continuous	2	1-1616131-3

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

## Q-50 Series Relay, Current Indicator, Rated up to 20 Amps, 28 Vdc

### Product Facts

- SPST NC or SPST NO
- Environmentally sealed
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

**Contact Arrangement** —  
SPST NC, SPST NO or SPDT

**Contact Rating @ 28 Vdc** —

- Q-50AB-2 — 0.2 Amp
- Q-50J, — 0.25 Amp
- Q-50AG — 1.0 Amp
- Q-50AB-1 — 1 Amp switching, and 2 Amps carry
- Q50AC — 2 Amp

**Lamp Load @ 28 Vdc** —

- Q-50AC, Q-50AB-2 — 0.08 Amp
- Q-50J, Q-50AG — 0.20 Amp

**Operating Voltage, Nom.** — 28 Vdc

**Sensing Current Rating** —

- 20 Amps continuous, max. except for Q-50AB-1 and Q-50AB-2 which are 10

Amps max. and 15 Amps max. for 3 sec. Q50AC 2 Amps continuous 10 Amps max. for 5 seconds

**Pickup Max.** —

- Q-50AC — 0.3 Amp
- Q-50AB-1, Q-50AB-2 — 1.5 Amp
- Q-50J — 3.5 Amps DC
- Q-50AG — 6 Amps DC ± 20%

**Dropout Min.** —

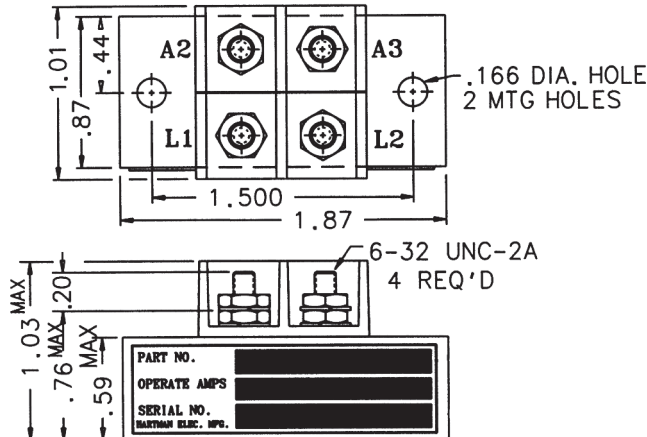
- Q-50AC — 0.1 Amp
- Q-50J — 0.5 Amp
- Q-50AB-1, Q-50AB-2 — less than 1 Amp
- Q-50AG — 2.4 Amp

### General Characteristics

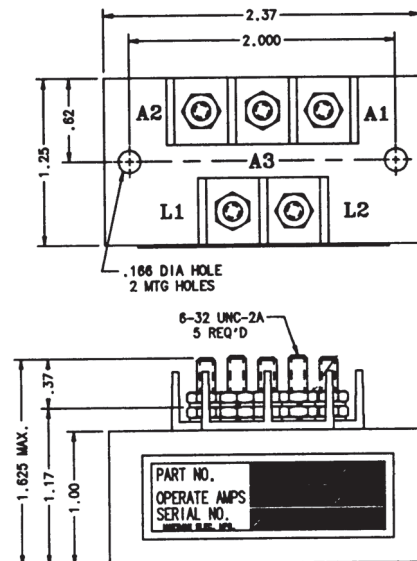
**Temperature Range** —  
-55°C to +71°C

**Altitude, Max.** —  
Q-50J, Q-50AB-1 — 50,000 ft  
Q-50AC, Q-50AG, Q-50AB-2 — 60,000 ft

**Weight, Max.** — 1.25 oz



Mounting Style A

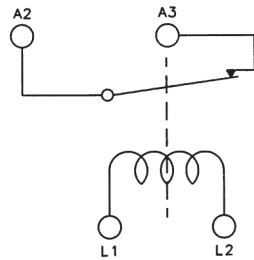


Mounting Style B

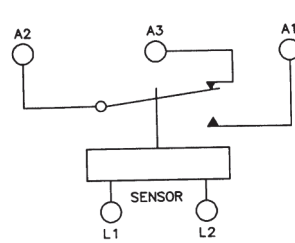
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

**Q-50 Series Relay, Current Indicator, Rated up to 20 Amps, 28 Vdc** (Continued)

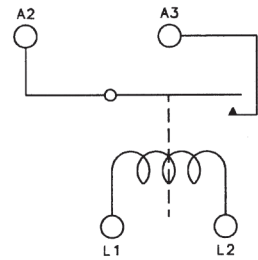
**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 2



Circuit Configuration 3

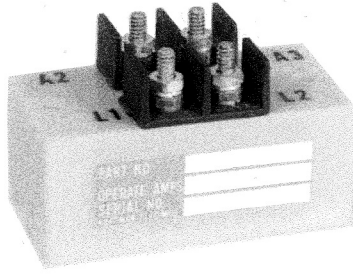
HARTMAN Part Number	Construction Type	Mounting Style	Duty Cycle	Circuit Config.	TE Part Number
Q-50J	Environmentally Sealed	A	Continuous	1	1-1616131-0
Q-50AC	Environmentally Sealed	B	Continuous	2	1616131-4
Q-50AG	Environmentally Sealed	A	Continuous	1	1616540-7
Q-50AB-1	Environmentally Sealed	A	Continuous	1	1616131-2
Q-50AB-2	Environmentally Sealed	A	Continuous	3	1616131-3

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

**QR-50 Series Relay, AC Current Indicator, Rated up to 5 Amps, 115 VAC**

**Product Facts**

- SPST NC
- Environmentally sealed
- Meets many requirements of MIL-PRF-6106



**Performance Data**

**Electrical Characteristics**

Contact Arrangement — SPST NC

Resistive Rating @ 28 Vdc — .25 Amp

Lamp Load @ 28 Vdc — .10 Amp

Sensing Current Rating — 5 Amp, AC continuous

**General Characteristics**

Temperature Range — -55°C to +85°C

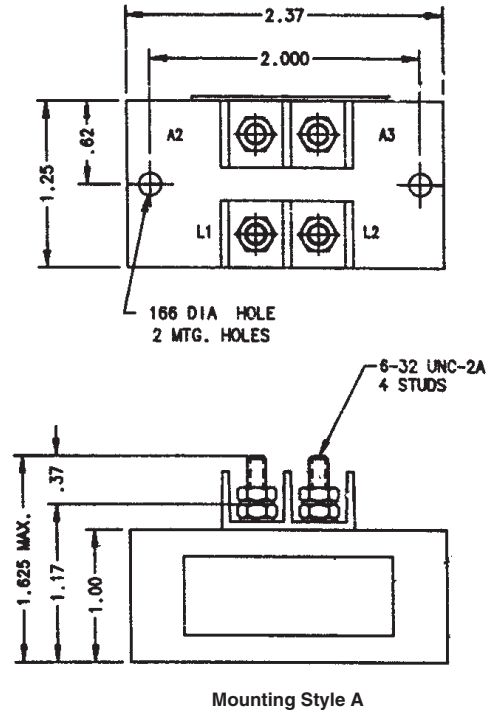
Altitude — 50,000 ft

Weight, Max. — .25 lbs

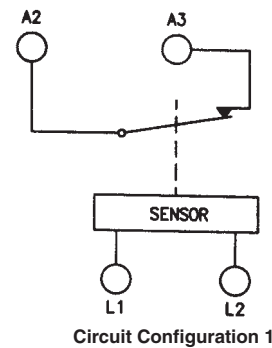
Operating Voltage, Nom. — 115 Vrms, 325-600 Hz

Pickup Max. — 95 MA, AC

Dropout Min. — 47 MA AC



**Circuit Configurations** (Consult factory for other available circuit configurations)



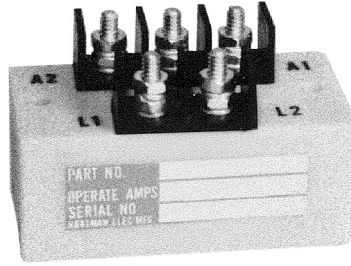
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

HARTMAN Part Number	Construction Type	Mounting Style	Duty Cycle	Circuit Config.	TE Part Number
QR-50V	Environmentally Sealed	A	Continuous	1	1616132-3

**QR-50 Series Relay, AC Current Indicator, Rated up to 15 Amps, 115 VAC**

**Product Facts**

- SPDT
- Environmentally sealed
- Meets many requirements of MIL-PRF-6106



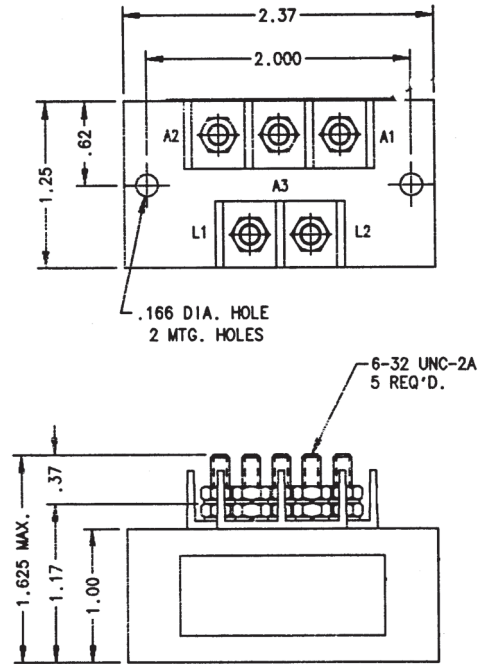
**Performance Data**

**Electrical Characteristics**

- Contact Arrangement** — SPDT
- Resistive Rating @ 28 Vdc** — .25 Amp
- Lamp Load @ 28 Vdc** — .08 Amp
- Operating Voltage, Nom.** — 115 VAC, 1 Phase, 400 Hz
- Pickup Max.** — 6 Amp, AC
- Dropout Min.** — 2.4 Amp, AC
- Sensing Current Rating** — 15 Amp, AC Continuous

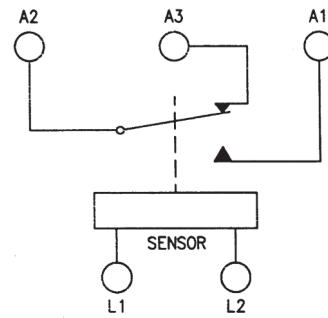
**General Characteristics**

- Temperature Range** — -55°C to +71°C
- Altitude** — 50,000 ft
- Weight, Max.** — .19 lbs
- Sinusoidal Vibration** — 10 G to 500 Hz



Mounting Style A

**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

HARTMAN Part Number	Construction Type	Mounting Style	Duty Cycle	Circuit Config.	TE Part Number
QR-50H	Environmentally Sealed	A	Continuous	1	1616132-1



## E-316C Series Relay, Undervoltage AC 3 Phase, Lowest of 3

### Product Facts

- DPDT
- Gasket sealed
- Meets many requirements of MIL-PRF-6106

### Performance Data

#### Electrical Characteristics

**Contact Arrangement** — DPDT

**Resistive Rating @ 28 Vdc** — 10 Amps

**Inductive Rating** — 5 Amps

**Lamp Load** — 1.5 Amps

**Rated Operating Voltage, Nom.** — 115 V, 400 Hz

**Pickup Voltage (All 3 Phases Up)** — 85-90 Volts

**Dropout Voltage (3 Phase Lowest of 3)** — 75-80 Volts

### General Characteristics

**Temperature Range** — -55°C to +71°C

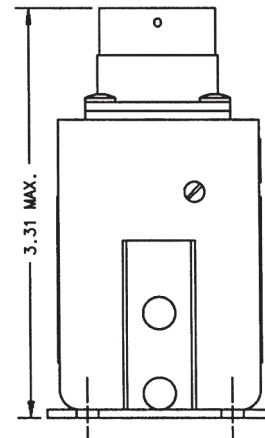
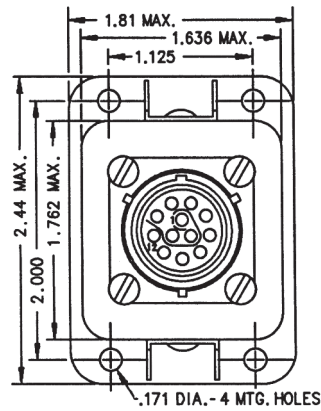
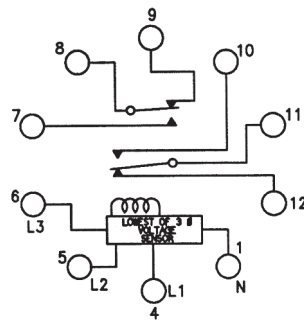
**Operating Cycles (Life) at Rated Resistive Load, Min.** — 10,000 cycles

**Weight, Max.** — 10 oz.

**Operating Voltage, Max.** — 124 VAC

### Circuit Configurations

(Consult factory for other available circuit configurations)



Mounting Style A

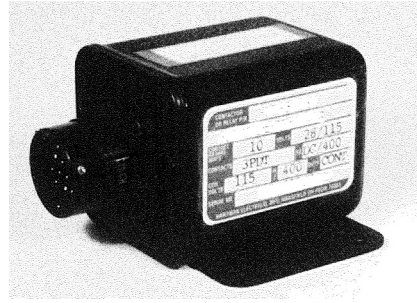
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

HARTMAN Part Number	Construction Type	Mounting Style	Duty Cycle	Circuit Config.	TE Part Number
E-316C	Gasket/Vented	A	Continuous	1	1-1616126-4

## E-311PB Series Relay, Undervoltage with Time Delay

### Product Facts

- 2PDT
- Solder sealed, hermetically sealed
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

Main Contacts —

Contact Arrangement — 2PDT

Operating Voltage, Nom. — 28 Vdc

Resistive Rating — 10 Amps

Inductive Rating — 6 Amps

Motor Rating — 3 Amps

Lamp Rating — 1 Amps

Pickup Time, Max. — 125 msec

Contact Bounce, Max. — 3 msec

Operating Voltage, Max. — 36 Vdc

Operating Voltage, Nom. — 28 Vdc

Pickup Voltage —  $24.5 \pm 0.5$  Vdc

Dropout Voltage —  $21.5 \pm 0.5$  Vdc

Dropout Time Delay — 200-400 milliseconds when the relay is in the energized position and the voltage drops below  $21.5 \pm 0.5$  Vdc and above 15 Vdc. The relay will remain energized for 200 to 400 milliseconds before de-energizing when the voltage drops below 15 Vdc. Time delay is 30 Ms max.

Operating Current, Max.

@ 25°C — 150 milliamp

#### General Characteristics

Ambient Temperature Range —

-55°C to +85°C

Operating Cycles (Life) at Rated

Resistive Load, Min. —

100,000 cycles

Dielectric Withstanding Voltage —

1,000 Vrms, 60 Hz, 1 mil/Amp max. leakage

Insulation Resistance @ 500 Vdc — 100 megohm min.

Altitude — 80,000 ft

Weight, Max. — .25 lbs

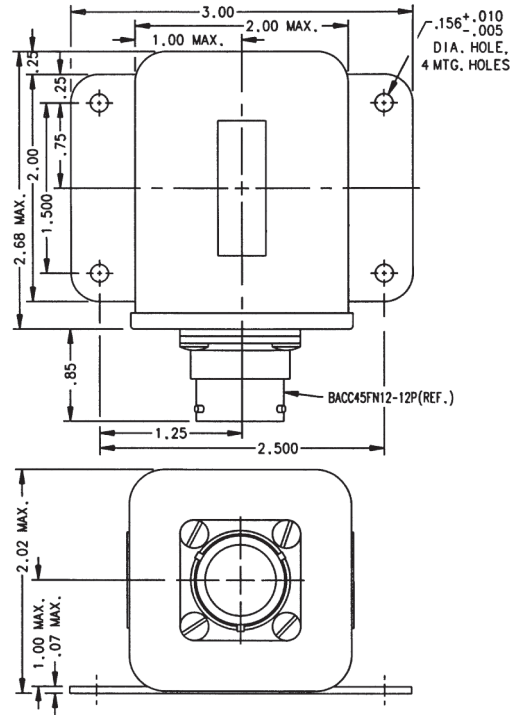
Sinusoidal Vibration —

.060 DA @ 5 to 80 Hz

20 G™ 80 to 2000 Hz

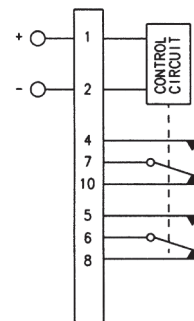
Shock for 11 msec, 1/2 Sine, 3

Axes — 30 G



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

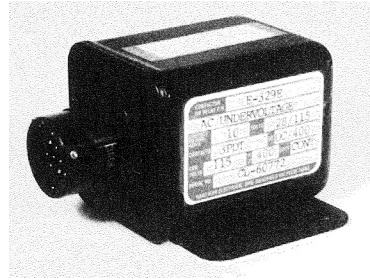
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

HARTMAN Part Number	Construction Type	Mounting Style	Duty Cycle	Circuit Config.	TE Part Number
E-311PB	Hermetically Sealed	A	Continuous	1	1-1616126-1

## E-329 Series Relay, Voltage Sensing

### Product Facts

- 3PDT
- Solder sealed cover, hermetically sealed contacts
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

**Contact Arrangement** — 3PDT

**Rated Operating Voltage** — 28 Vdc, and 155 Vac 400 Hz

**Resistive Rating** — 10 Amps

**Inductive Rating** — 8 Amps

**Motor Rating** — 4 Amps

**Lamp Rating** — 2 Amps

**Pickup Time, Max.** — 70 msec

**Contact Bounce, Max.** — 3 msec

**Dropout Time Delay** —

200-400 msec when the relay is in the energized position and the voltage drops below  $104 \pm 2$  Vrms and above  $88 \pm 4$  Vrms. The relay will remain energized for 200-400 msec before deenergizing. When the voltage drops below  $88 \pm 4$  Vrms no time delay is required. When the voltage drops to 30 volts or less the relay will de-energize 50 msec max.

**Operating Voltage, Nom.** — 115 VAC, RMS L-N

**Operating Voltage, Max.** — 122 VAC, RMS L-N

**Operating Frequency** —  $400 \pm 20$  Hz

**Pickup Voltage** —  $109 \pm 2$  Vrms

**Dropout Voltage** —  $104 \pm 2$  Vrms

**Operating Current, Max. @ 25°C** — 100 milliamp

#### General Characteristics

**Temperature Range** —  $-55^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$

**Operating Cycles (Life) at Rated Resistive Load, Min.** — 100,000 cycles

**Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles

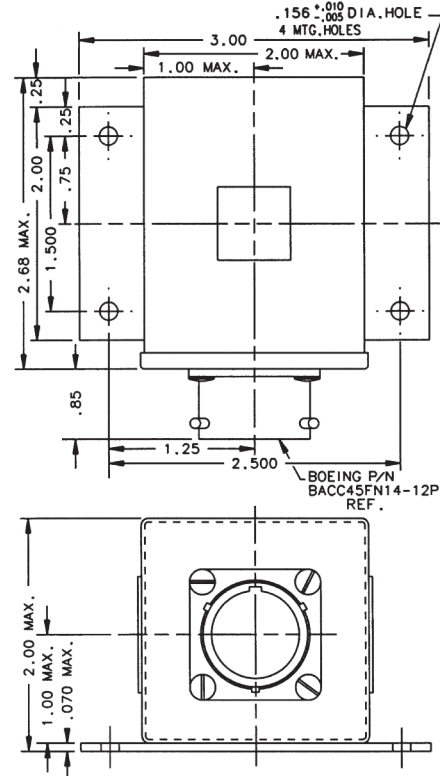
**Dielectric Withstanding Voltage** — 1,000 Vrms, 60 Hz

**Insulation Resistance @ 500 Vdc** — 1,000 megohm min.

**Altitude** — 0-80,000 ft

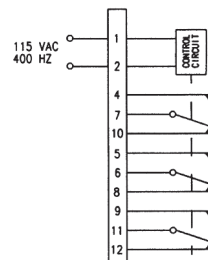
**Weight, Max.** — 10 oz

**Shock for 11 msec, 1/2 Sine, 3 Axis** — 30 G



Mounting Style A

### Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

HARTMAN Part Number	Construction Type	Mounting Style	Duty Cycle	Circuit Config.	TE Part Number
E-329E	Hermetically Sealed	A	Continuous	1	1-1616126-9

## RA-3100 Series Remote Power Controller, Rated up to 60 Amps, 115/208 VAC

### Product Facts

- 3PST NO
- Gasket sealed



### Performance Data

#### Electrical Characteristics

**Contact Arrangement** — 3PST NO

**Rated Operating Voltage** — 115/208 VAC, 400-610 Hz, 3 phase

**Resistive Rating** — 50 Amp

**Motor Rating** — 30 Amp

**Rupture Rating** — 1000 Amp

**Closing Time, Max., Override at 28 Vdc** — 35 msec

**Opening Time, Max., Override at 28 Vdc** — 25 msec

**Contact Bounce, Max.** — 3 msec

#### Coil Characteristics

**Duty Cycle** — Continuous, economizing

**Operating Voltage, Max.** — 32 Vdc  
**Operating Voltage @ 85°C, Min.** — 18 Vdc

**Trip Time @ 60 Amp Current +10%** — 2.0 to 3.0 sec

**Trip Time @ 75 Amp Current +10%** — 1.0 to 1.9 sec

**Trip Time @ 95 Amp Current +10%** — .2 to .9 sec

**Trip Time @ 200+ Amp Current +10%** — 0.01 to 0.1 sec

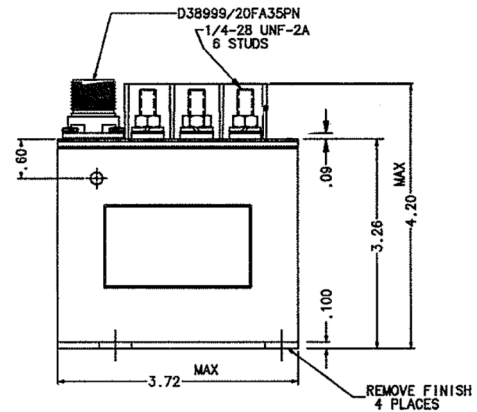
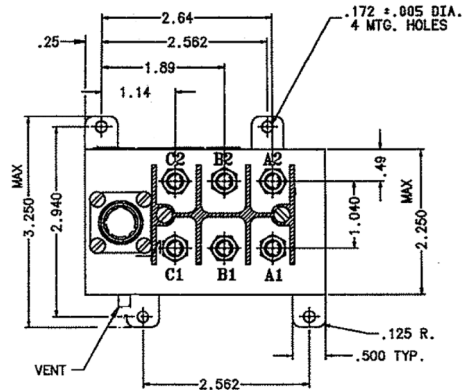
#### General Characteristics

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

**Operating Cycles (Life)** — 100,000 cycles

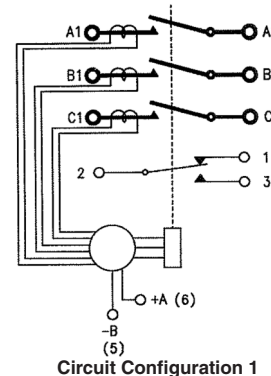
**Altitude** — 50,000 ft

**Weight, Max.** — 1.55 lbs



Mounting Style A

**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
RA-3100H	Gasket/Vented	A	Continuous, Economizing	1	1616539-3

## RA-3100 Series Remote Power Controller, Rated up to 70 Amps, 115/208 VAC

### Product Facts

- 3PST NO
- Gasket sealed



### Performance Data

#### Electrical Characteristics

**Contact Arrangement** — 3PST NO

**Rated Operating Voltage** — 115/208 VAC, 400-610 Hz, 3 phase

**Resistive Rating** — 70 Amp

**Motor Rating** — 70 Amp

**Rupture Rating** — 1,000 Amp

#### Coil Characteristics

**Duty Cycle** — Continuous, economizing

**Operating Voltage, Max.** — 32 Vdc

**Operating Voltage @ 85°C, Min.** — 18 Vdc

**Trip Time @ 70 Amp Current**

+10% — 3.0 to 5.0 sec

**Trip Time @ 87 Amp Current +10%**

— 2.0 to 2.9sec

**Trip Time @ 111 Amp Current**

+10% — 1.0 to 1.8 sec

**Trip Time @ 200 Amp Current**

+10% — 0.25 to 0.5 sec

#### General Characteristics

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

**Altitude** — 50,000 ft max.

**Weight, Max.** — 1.55 lb

**Sinusoidal Vibration** —

.038 DA from 10 to 50 Hz

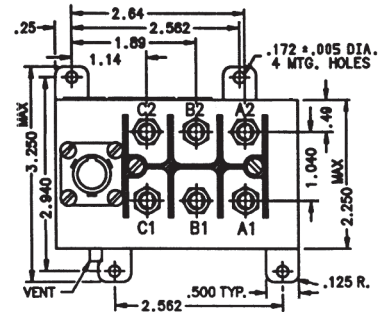
10g from 55 to 2000 Hz

**Shock, Max.** — 9 G max for 10-12 ms

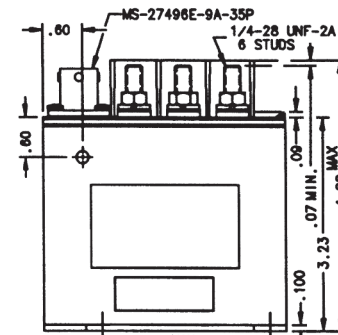
**Load, Min.** — 50,000 cycles

**Operating Cycles (Life)**

**Mechanical, Min.** — 100,000 cycles

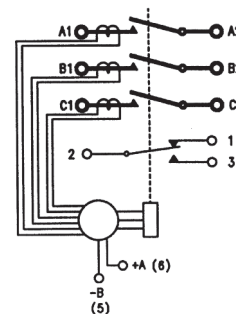


NOTE: FOR PROPER OPERATION, PIN A REQUIRES 18 TO 28 VDC



Mounting Style A

**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
RA-3100F	Gasket/Vented	A	Continuous, Economizing	1	1616133-2

## RA-3100 Series Remote Power Controller, Rated up to 100 Amps, 115/208 VAC

### Product Facts

- 3PST NO
- Gasket sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

**Contact Arrangement** — 3PST NO

**Rated Operating Voltage** — 115/208 VAC, 400-610 Hz, 3 phase

**Resistive Rating** — 100 Amp

**Motor Rating** — 100 Amp

**Rupture Rating** — 1,000 Amp

**Closing Time, Max., at 28 Vdc** — 35 msec

**Opening Time, Max., at 28 Vdc** — 25 msec

**Contact Bounce, Max.** — 3 msec

#### Coil Characteristics

**Duty Cycle** — Continuous, economizing

**Operating Voltage, Max.** — 32 Vdc

**Operating Voltage @ 85°C, Min.** — 18 Vdc

**Coil Current, Inrush Max. @ 25°C** — 6.0 Amps

**Coil Current, Hold Max. @ 25°C** — 0.5 Amps

**Trip Time @ 28 Amp Current**

**+10%** —

RA-3100M - 1.0 to 1.50 sec

**Trip Time @ 151 Amp Current**

**+10%** — RA-3100D - 3.0 to 5.0 Sec.

**Trip Time @ 185 Amp Current**

**+10%** — RA-3100D - 2 to 2.9 Sec.

**Trip Time @ 237 Amp Current**

**+10%** — RA-3100D - 1 to 2.5 Sec.

#### General Characteristics

**Temperature Range** —

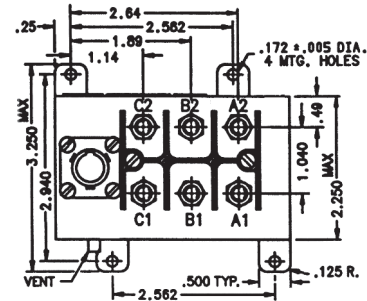
-55°C to +85°C

**Operating Cycles (Life) at Rated Load, Min.** — 50,000 cycles

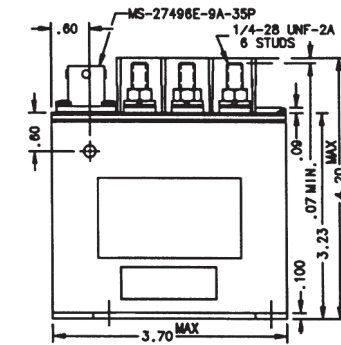
**Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles

**Altitude** — 50,000 ft

**Weight, Max.** — 1.55 lbs

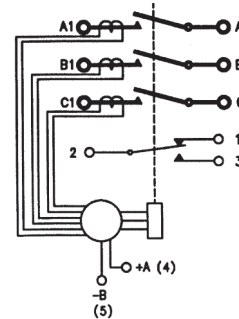


NOTE: FOR PROPER OPERATION, PIN A REQUIRES 18 TO 28 VDC



Mounting Style A

**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1

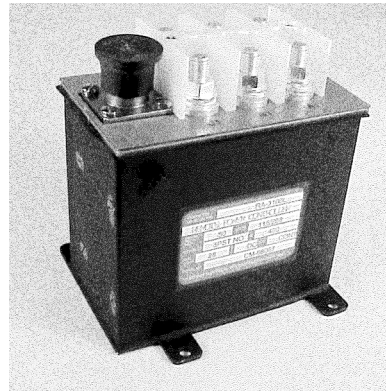
HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
RA-3100D	Gasket/Vented	A	Continuous, Economizing	1	1616133-1
RA-3100M	Gasket/Vented	A	Continuous, Economizing	1	1616133-5

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

## RA-3100 Series Remote Power Controller, Rated up to 110 Amps, 115/208 VAC

### Product Facts

- 3PST NO
- Gasket sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



### Performance Data

#### Electrical Characteristics

**Contact Arrangement** — 3PST NO

**Rated Operating Voltage** — 115/208 VAC, 400-610 Hz, 3 phase

**Resistive Rating** —

RA-3100J-1 - 110 Amp

RA-3100L - 50 Amp

**Motor Rating** —

RA-3100J01 - 110 Amp

RA-3100L - 50 Amp

**Rupture Rating** —

RA-3100J-1 - 1,100 Amp

RA-3100L - 500 Amp

**Shock for 10-12 msec** — 50 G

**Closing Time, Max., Override at 28 Vdc** — 35 msec

**Opening Time, Max., Override at 28 Vdc** — 25 msec

**Contact Bounce, Max.** — 3 msec

#### Coil Characteristics

**Duty Cycle** — Continuous, economizing

**Operating Voltage, Max.** — 32 Vdc

**Operating Voltage @ 85°C, Min.** — 18 Vdc

**Coil Current, Inrush Max. @ 25°C** — 6.0 Amps

**Coil Current, Hold Max. @ 25°C** — 0.5 Amps

**Trip Time @ 165 Amp Current +10%** — 8.0 to 10.0 sec

**Trip Time @ 330 Amp Current +10%** —

RA-3100J-1 - 1.2 to 2.0 sec

**Trip Time @ 550 Amp Current +10%** —

RA-3100J-1 - 0.34 to 0.65 sec

**Trip Time @ 1100 Amp Current +10%** —

RA-3100J-1 - 0.07 to 0.20 sec

**Trip Time @ 60 Amp Current +10%** —

RA-3100L - 8.0 to 10.0 sec

**Trip Time @ 150 Amp Current +10%** —

RA-3100L - 4.0 to 6.0 sec

**Trip Time @ 300 Amp Current +10%** —

RA-3100L - 2.0 to 3.0 sec

**Trip Time @ 500 Amp Current +10%** —

RA-3100L - 0.07 to 0.20 sec

#### General Characteristics

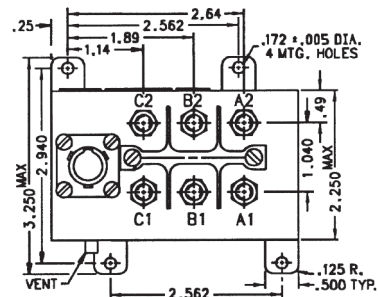
**Temperature Range** — -55°C to +85°C

**Operating Cycles (Life) at Rated Load, Min.** — 50,000 cycles

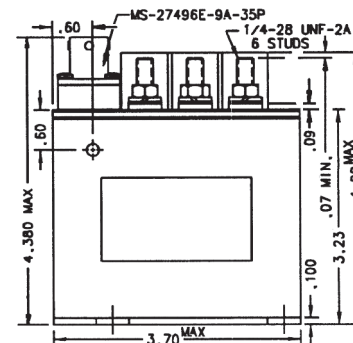
**Operating Cycles (Life) Mechanical, Min.** — 100,000 cycles

**Altitude** — 60,000 ft

**Weight, Max.** — 1.55 lbs

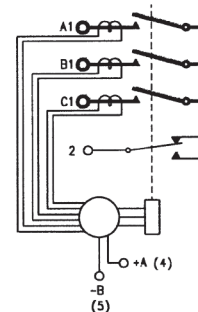


NOTE: FOR PROPER OPERATION, PIN A REQUIRES 18 TO 28 VDC



Mounting Style A

**Circuit Configurations** (Consult factory for other available circuit configurations)



Circuit Configuration 1

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
RA-3100J-1	Gasket/Vented	A	Continuous, Economizing	1	1616133-3
RA-3100L	Gasket/Vented	A	Continuous, Economizing	1	1616133-4

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

## E-308TA Series, Undervoltage Sensor, Rated up to 10 Amps, 28 Vdc

### Product Facts

- DPDT
- Gasket sealed
- Meets many requirements of MIL-PRF-6106

### Performance Data

#### Electrical Characteristics

**Contact Arrangement** — DPDT  
**Operating Voltage, Nom.** — 28 Vdc  
**Resistive Rating** — 10 Amps  
**Inductive Rating** — 2 Amps

### General Characteristics

#### Operating Ambient Temperature

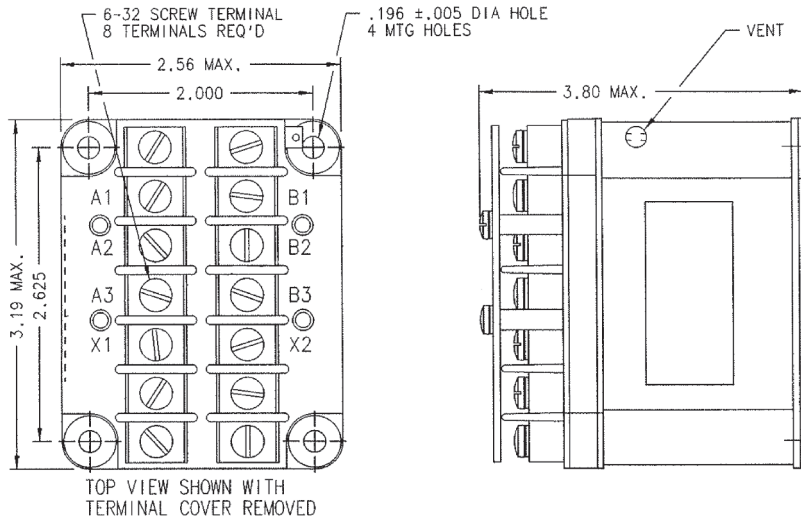
**Range** — -55°F to +165°F  
**Altitude** — 50,000 ft  
**Weight, Max.** — 15.5 oz

### Coil Characteristics

**Duty Cycle** — Continuous  
**Input to Sensor, Nom.** — 120 V, 400 Hz

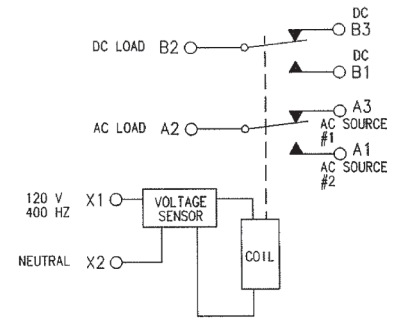
### Operating Characteristic —

Contacts A1-A2, B1-B2 will close if the AC input voltage is above  $106 \pm 2$  VAC  
 Contacts A1-A2, B1-B2 will open if the AC input voltage falls below  $106 \pm 2$  VAC.



Mounting Style A

### Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
E-308TA	Gasket/Vented	A	Continuous	1	1616126-6

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



### Cross Reference

Main Current Rating	AC/DC	Rating	Main Contact Config.	Operating Mode	Aux. Contact Config.	Coil Voltage (VDC)	Seal Type	Duty Cycle	Coil Trans. Voltage	Hartman Part No.	TE Part No.
10	DC	28	DPDT	Side Stable	—	115V	Gasket/Vented		Cont.	E-328-2	1-1616126-8
200	DC	28	SPST NO	Side Stable	SPST NC	24-30	Gasket/Vented		Cont.	A772XTB	1616545-1
25	AC	—	—	Side Stable	SPDT	28	Gasket/Vented		Cont.	E-387C-1	2-1616126-3
100	DC	28	SPST NO	Side Stable	SPST NC SPST NO.	28	Gasket/Vented		Cont.	A-700BU	1616109-6
200	DC	28	SPST NO	Side Stable	N/A	28	Gasket/Vented		Cont.	A-700AQ-4	1616109-4
		28	SPST NO	Side Stable	N/A	28	Gasket/Vented		Cont.	A-700AAP	1616109-1
300	DC	28	SPST NO	Side Stable	—	24-30	Gasket/Vented		Cont.	A-700ZC-7	1616109-7
		28	SPST NO	Side Stable	SPST NC	24-30	Gasket/Vented		Cont.	A-700ZG	1616109-9
400	DC	28	SPST NO	Side Stable	—	24-30	Gasket/Vented	Cont. Econ.		A-701D	1-1616109-1
		28	SPST NO	Side Stable	SPDT	24-30	Gasket/Vented	Cont. Econ.		A-701C	1-1616109-0
600	DC	28	SPST NO	Side Stable	—	28	Gasket/Vented		Cont.	A-702AAP	1-1616109-3
3	AC/DC	28/115	SPST NO	Side Stable	—	—	Gasket/Vented		—	B-188MA-1	1616114-7
		29	SPST NO	Side Stable	SPST NO	28	Gasket/Vented		Int.	A-711JF	1-1616109-6
600	DC	29	SPST NO	Side Stable	SPST NO	28	Gasket/Vented		Int.	A-711JM	1-1616109-7
		29	SPST NO	Side Stable	SPDT	28	Gasket/Vented		Int.	A-711Z	6-1616071-3
		29	SPST NO	Side Stable	—	28	Gasket/Vented		Int.	A-711R	1-1616109-8
		28	SPST NO	Side Stable	SPST NO SPST NC	24-30	Gasket/Vented		Cont.	A-957CSD	1616110-6
200	DC	28	SPST NO	Side Stable	SPST NO SPST NC	24-30	Gasket/Vented		Cont.	A-957G	1616110-8
300	DC	24/30	SPST NO	Side Stable	—	24-30	Gasket/Vented		Cont.	A-957E	1616110-7
350	DC	28	SPST NO	Side Stable	SPDT	24-30	Gasket/Vented		Cont.	A-957CA	1616110-5
2	DC	28	SPST NC	Side Stable	—	120	Environ		Cont.	Q-50Y	1-1616131-2
3.5	DC	28	SPDT	Side Stable	—	29	Environ		Cont.	Q-50F	1616131-9
		28	SPDT	Side Stable	—	28	Environ		Cont.	Q-50BB	1616131-5
6.25	DC	28	SPDT	Side Stable	—	28	Environ		Cont.	Q-50E	1616131-8
		28	SPDT	Side Stable	—	28	Environ		Cont.	Q-50BD	1616131-6
10	DC	28	SPST NO	Side Stable	—	28	Environ		Cont.	Q-50A	1616131-1
15	DC	28	SPDT	Side Stable	—	28	Environ		Cont.	Q-50CC	1616131-7
16	DC	28	SPDT	Side Stable	—	28	Environ		Cont.	Q-50S	1-1616131-1
	DC	28	SPDT	Side Stable	—	28	Environ		Cont.	Q-50Z	1-1616131-3
		28	SPST NC	Side Stable	—	28	Environ		Cont.	Q-50J	1-1616131-0
		28	SPST NO	Side Stable	—	28	Environ		Cont.	Q-50AC	1616131-4
20	DC	28	SPST NO	Side Stable	—	28	Environ		Cont.	Q-50AG	1616540-7
		28	SPST NC	Side Stable	—	28	Environ		Cont.	Q-50AB-1	1616131-2
		28	SPST NC	Side Stable	—	28	Environ		Cont.	Q-50AB-2	1616131-3
5	AC	115	SPST NC	Side Stable	—	115	Environ		Cont.	Q-50V	1616132-3
15	AC	115	SPDT	Side Stable	—	115	Environ		Cont.	QR-50H	1616132-1
		28	DPDT	Side Stable	—	—	Gasket/Vented		Cont.	E-316C	1-1616126-4
10	DC	28	3PDT	Side Stable	—	28	Hermetic		Cont.	E-311PB	1-1616126-1
		28	3PDT	Side Stable	—	115	Hermetic		Cont.	E-329E	1-1616126-9

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

**Cross Reference** (Continued)

Main Current Rating	AC/DC	Rating	Main Contact Config.	Operating Mode	Aux. Contact Config.	Coil Voltage (VDC)	Seal Type	Duty Cycle	Coil Trans. Voltage	Hartman Part No.	TE Part No.
100	AC	115/208	3PST NO	Side Stable	SPDT	18-32	Gasket/Vented	Cont. Econ.		RA-3100M	1616133-5
		115/208	3PST NO	Side Stable	SPDT	18-32	Gasket/Vented	Cont. Econ.		RA-3100D	1616133-1
110	AC	115/208	3PST NO	Side Stable	SPDT	18-32	Gasket/Vented	Cont. Econ.		RA-3100J-1	1616133-3
50	AC	115/208	3PST NO	Side Stable	SPDT	18-32	Gasket/Vented	Cont. Econ.		RA-3100L	1616133-4
60	AC	115/208	3PST NO	Side Stable	SPDT	18-32	Gasket/Vented	Cont. Econ.		RA-3100H	1616539-3
70	AC	115/208	3PST NO	Side Stable	SPDT	18-32	Gasket/Vented	Cont. Econ.		RA-3100F	1616133-2
10	DC	28	DPDT	Side Stable	–	120V	Gasket/Vented	Cont.		E-308TA	1616126-6

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