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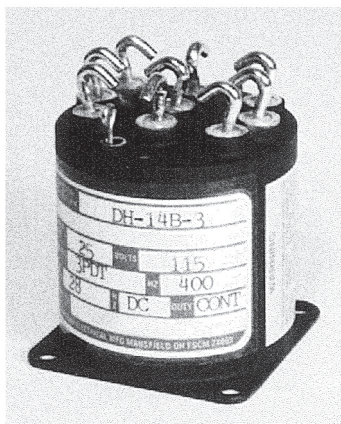
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DH-14 and DHR-14 Series Contactors, Rated up to 25 Amps, 115/200 VAC, 400 Hz

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

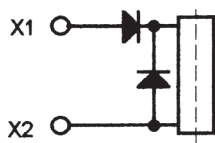
Coil Resistance ±20% @ 25°C —

VAC 400 Hz — N/A

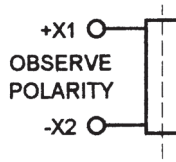
Vdc — 290 Ohms

Coil Characteristics

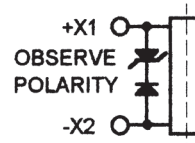
Coil Type



A — AC Continuous



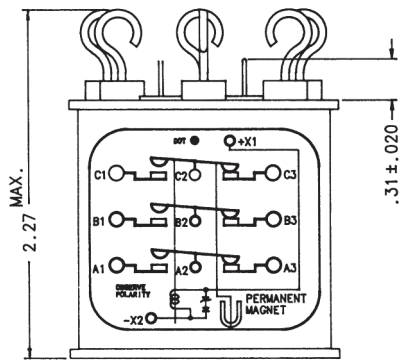
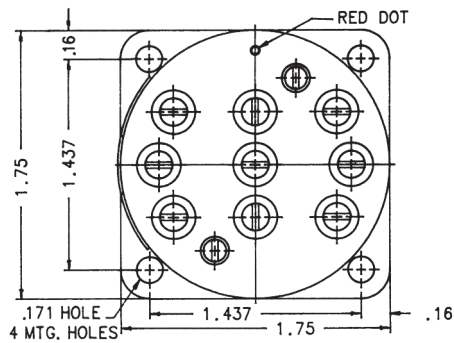
B — Continuous



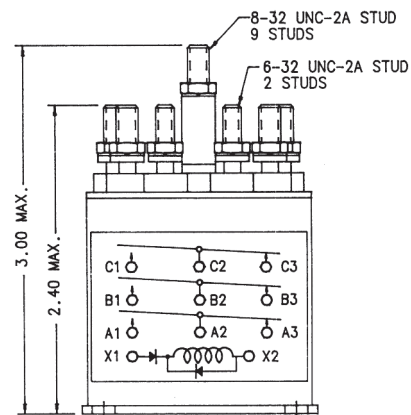
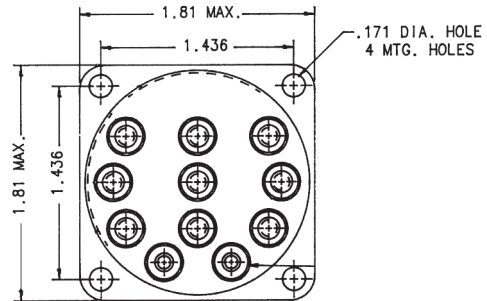
C — Continuous with Suppression

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

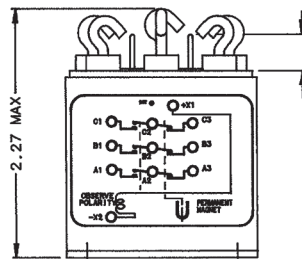
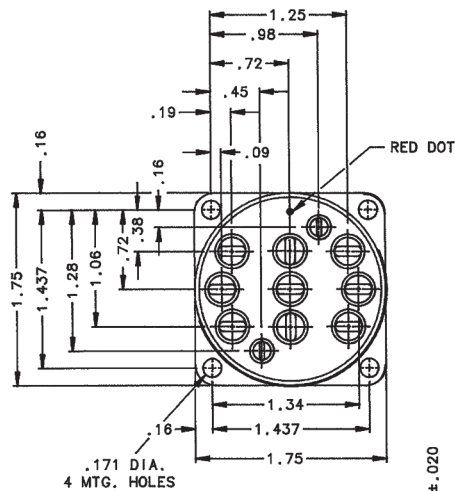
**DH-14 and DHR-14 Series Contactors, Rated up to 25 Amps,
115/200 VAC, 400 Hz (Continued)**



Mounting Style A



Mounting Style B

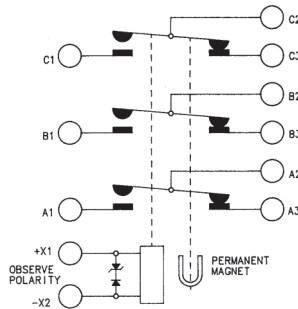


Mounting Style C

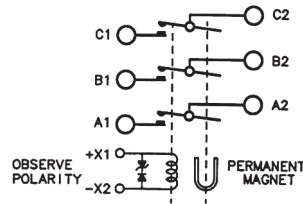
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

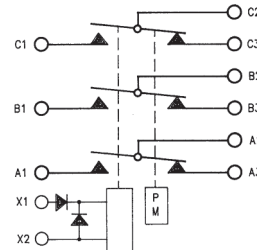
Circuit Configurations (Consult factory for other available circuit configurations)



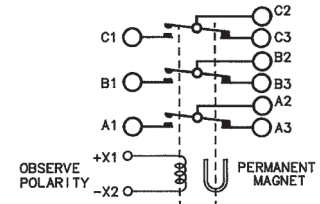
Circuit Configuration 1



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

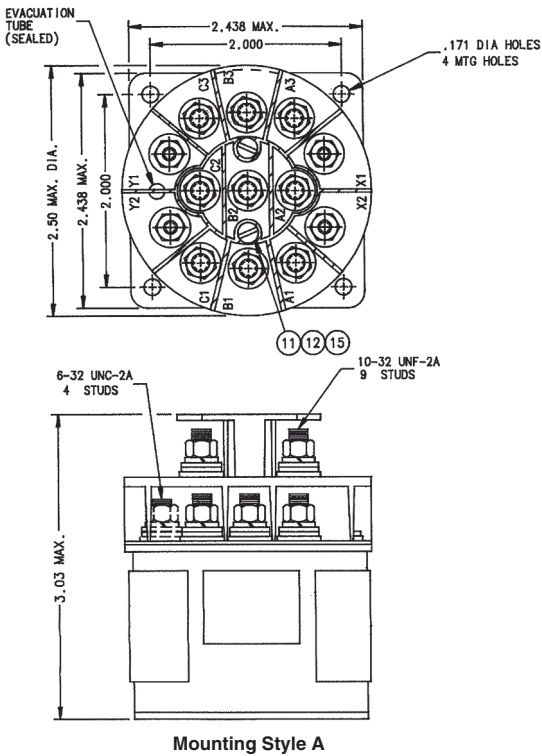
Duty Cycle — Continuous

Coil Rating — 115 VAC, 400 Hz

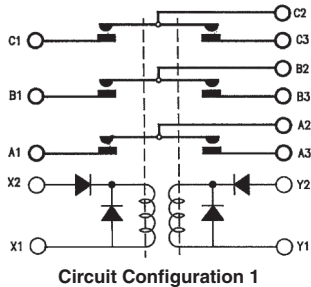
Pickup Voltage, Max. — 90 Vdc, Hot

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

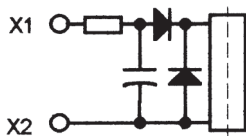
Pickup Voltage @ 25°C, Max. — VAC 400 Hz — 75 VAC
Vdc — 18 Vdc

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

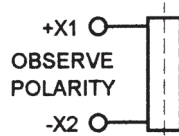
Coil Resistance ±20% @ 25°C — VAC 400 Hz — 505 Ohms
Vdc — 126 Ohms

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

Coil Type



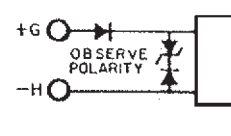
A — AC Continuous



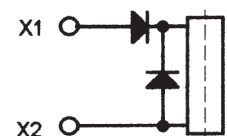
B — Continuous



C — Continuous with Suppression



D — Continuous with Suppression

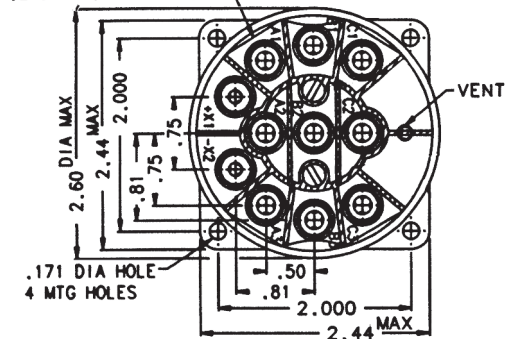


E — AC Continuous

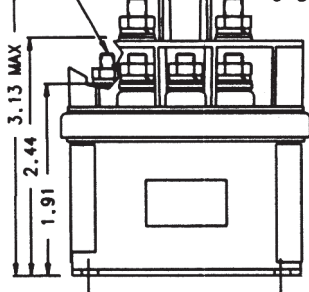
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

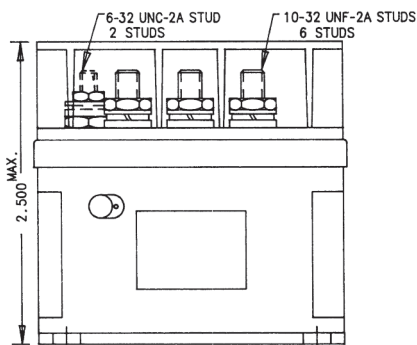
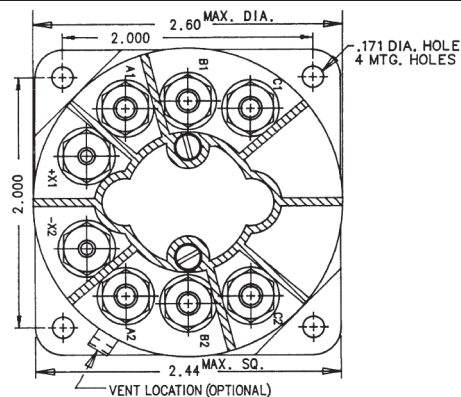
TERMINAL SHIELD CUTOUT
.270 MAX, 7 PLACES.



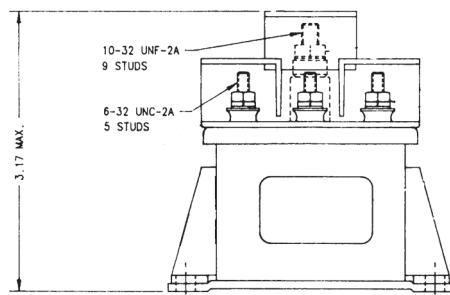
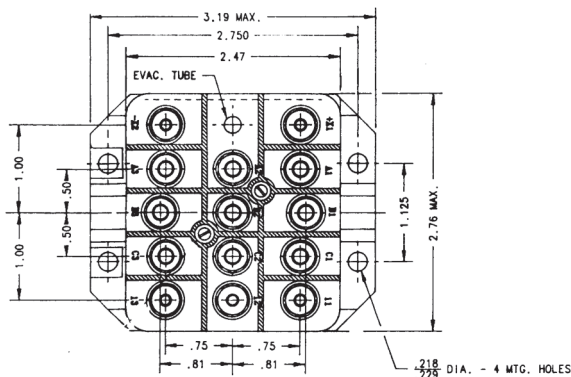
.437 MAX LUG DIA
6-32 UNC-2A
2 STUDS
10-32 UNF-2A
9 STUDS



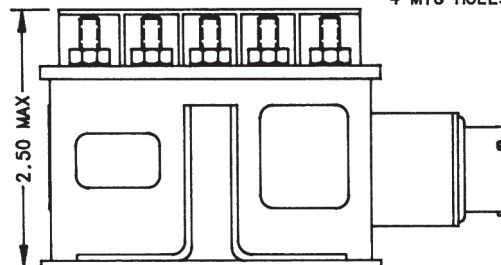
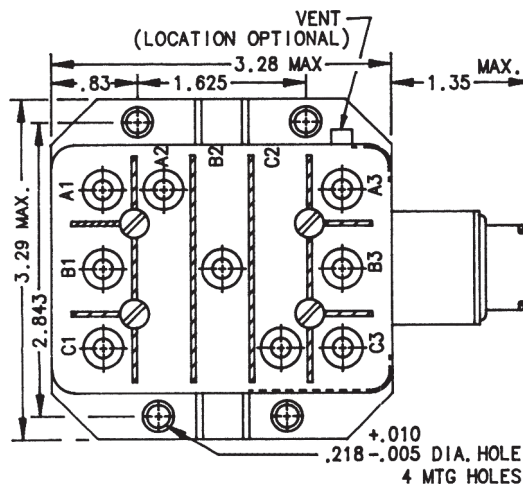
Mounting Style A



Mounting Style B



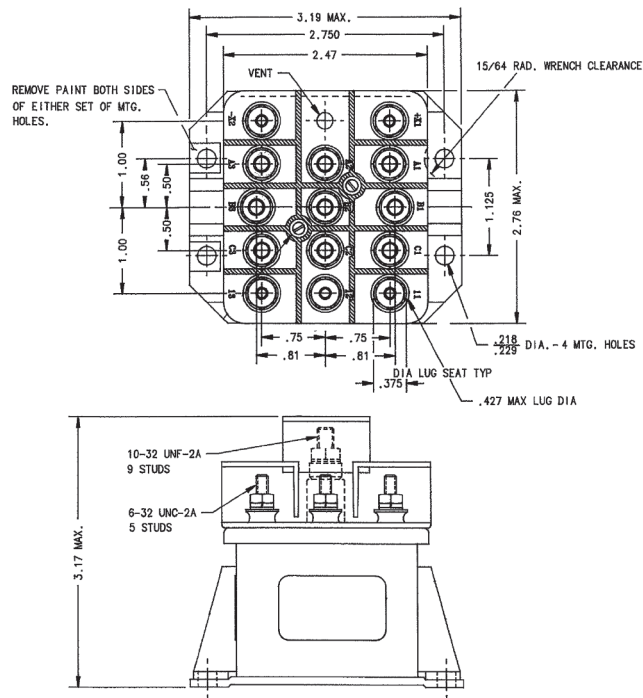
Mounting Style C



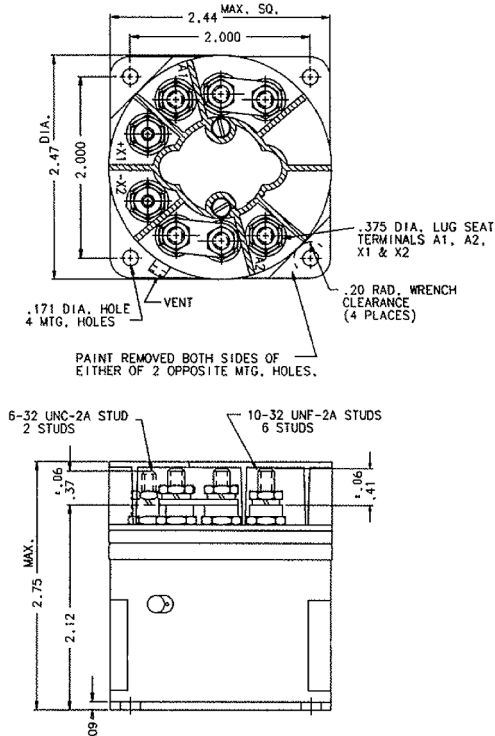
Mounting Style D

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

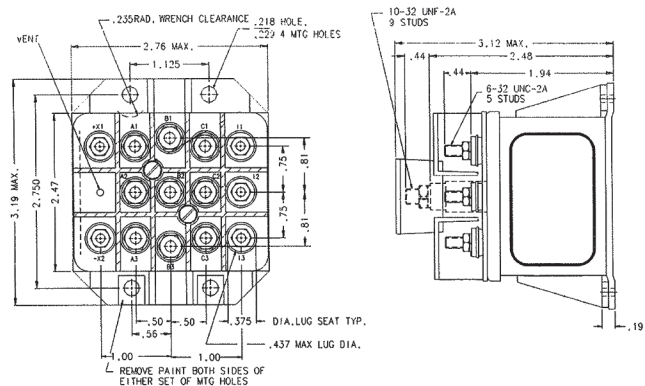
D7, DH7, DHR7, DR7 Series, Rated up to 50 Amps, 115/200 VAC, 400 Hz (Continued)



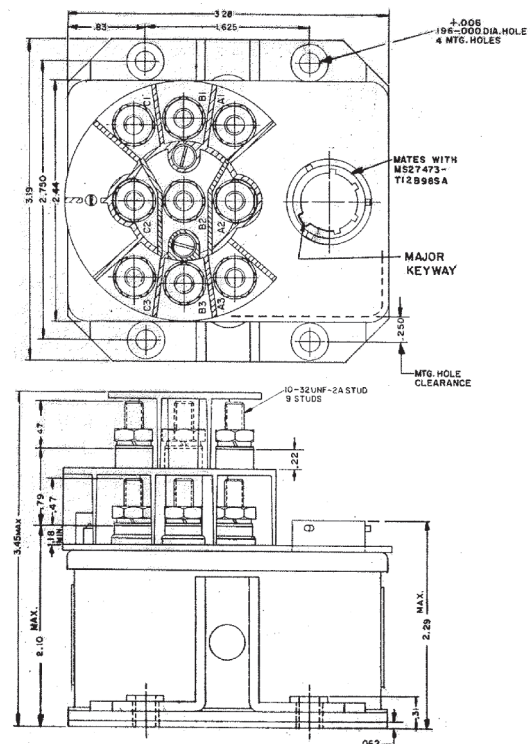
Mounting Style E



Mounting Style G



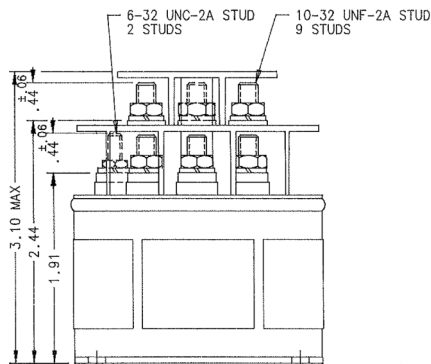
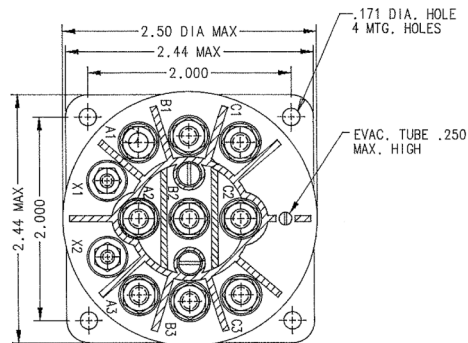
Mounting Style F



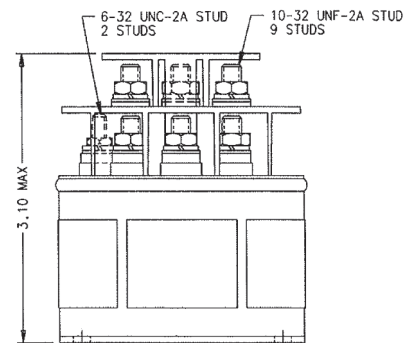
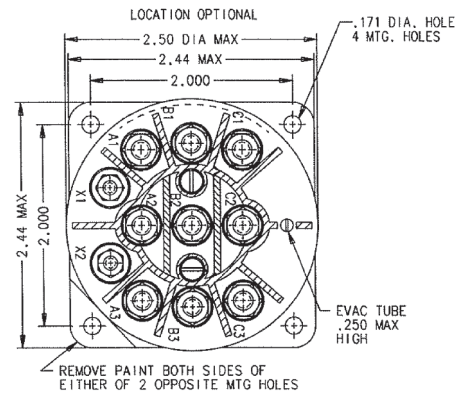
Mounting Style H

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

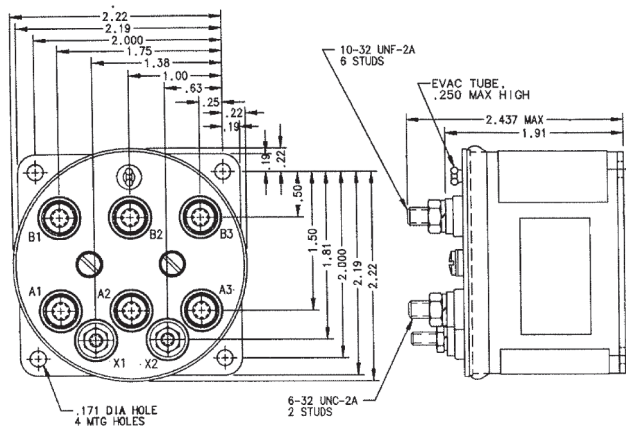
D7, DH7, DHR7, DR7 Series, Rated up to 50 Amps, 115/200 VAC, 400 Hz (Continued)



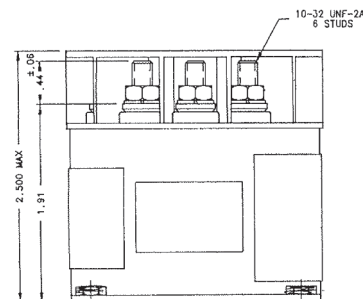
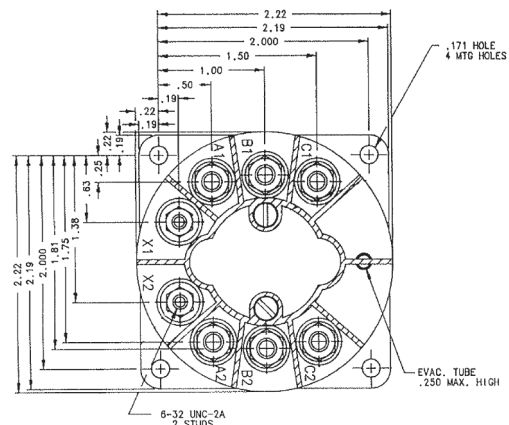
Mounting Style I



Mounting Style J



Mounting Style K

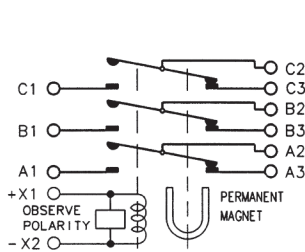


Mounting Style L

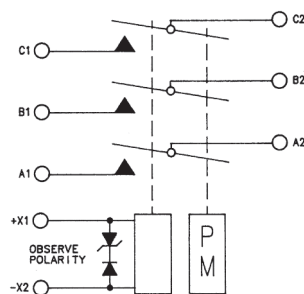
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

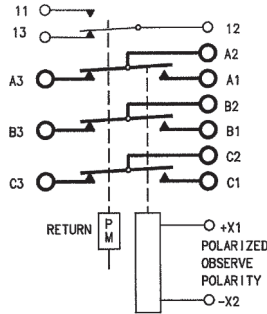
Circuit Configurations (Consult factory for other available circuit configurations)



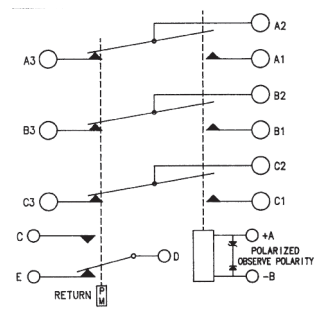
Circuit Configuration 1



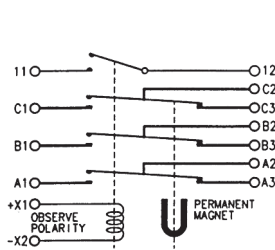
Circuit Configuration 2



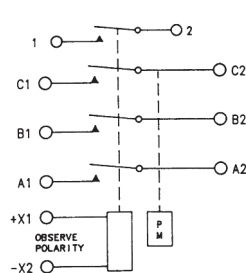
Circuit Configuration 3



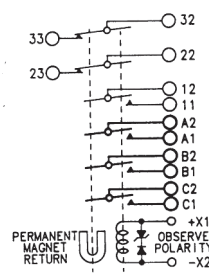
Circuit Configuration 4



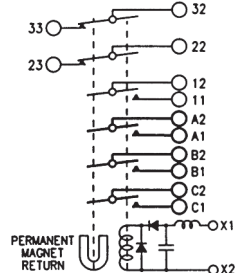
Circuit Configuration 5



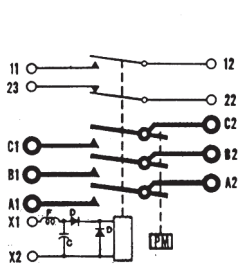
Circuit Configuration 6



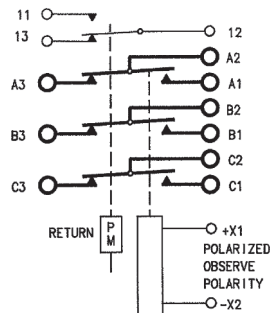
Circuit Configuration 7



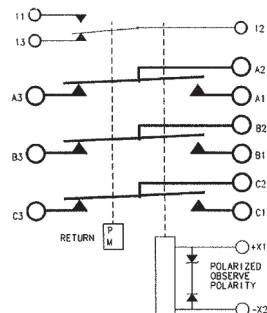
Circuit Configuration 8



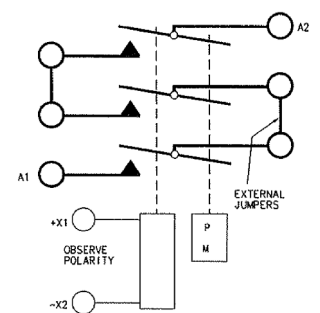
Circuit Configuration 9



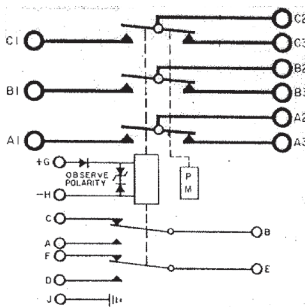
Circuit Configuration 10



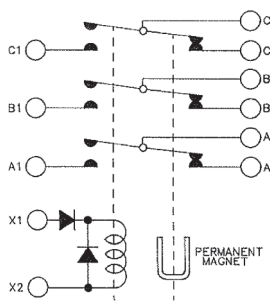
Circuit Configuration 11



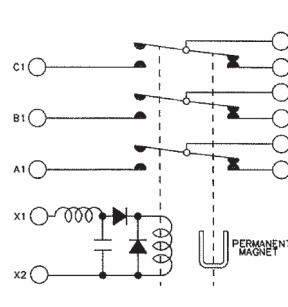
Circuit Configuration 12



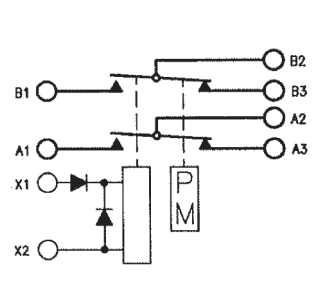
Circuit Configuration 13



Circuit Configuration 14



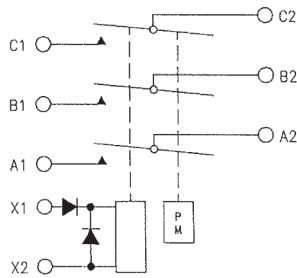
Circuit Configuration 15



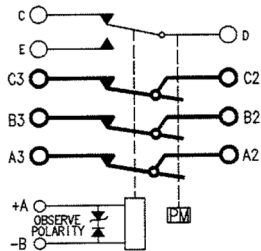
Circuit Configuration 16

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

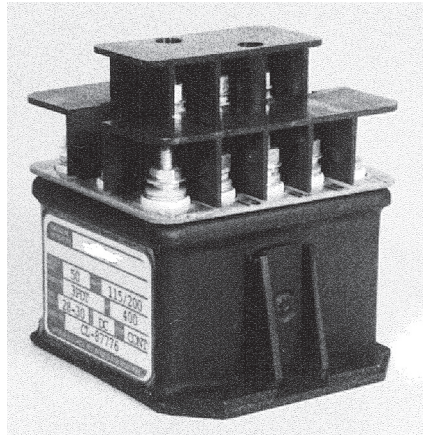
| HARTMAN Part Number | Construction Type | Mounting Style | Coil Type | Circuit Config. | TE Part Number |
|---------------------|---------------------|----------------|-----------|-----------------|----------------|
| D-7BS | Gasket/Vented | A | C | 1 | 1616036-1 |
| D-7M | Gasket/Vented | B | C | 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. —

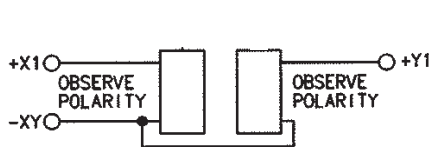
Coil Type A — 1.5 to 7 Vdc

Coil Type B — 2.5 to 6.5 Vdc

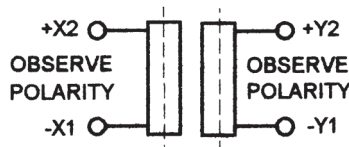
Coil Resistance ±20% @ 25°C — 175 Ohms

Coil Current @ 25°C, Max. — .175 Amp

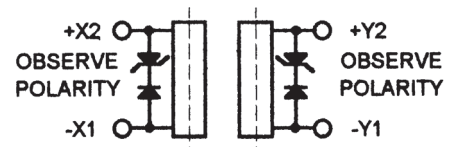
Coil Type



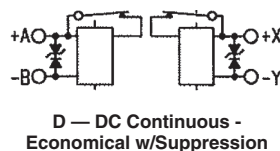
A — DC Continuous



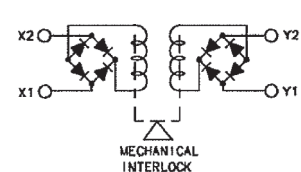
B — DC Continuous



C — DC Continuous with Suppression



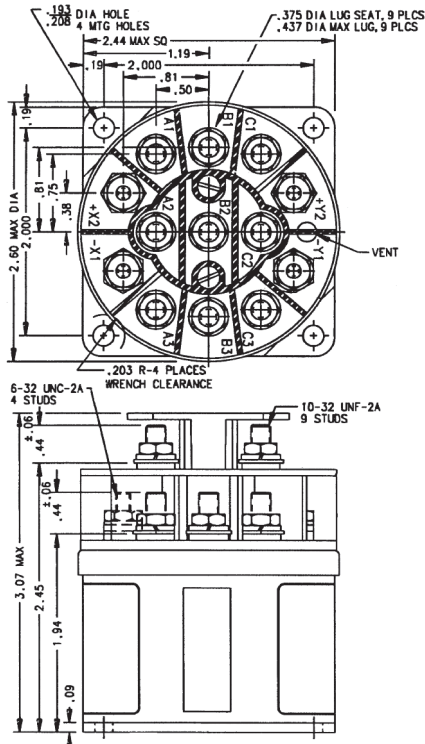
D — DC Continuous - Economical w/Suppression



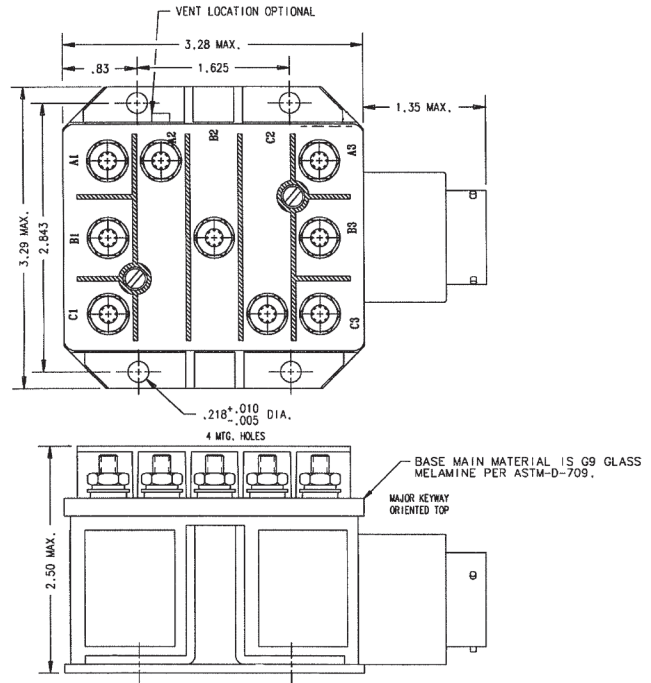
E — AC Continuous

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

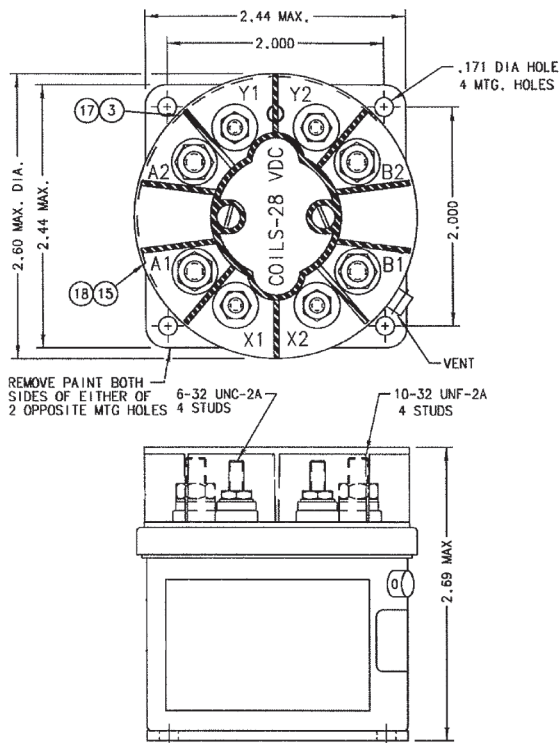
D18, DH18 and DHR18 Series Contactors, Rated up to 50 Amps, 115/200 VAC, 400 Hz (Continued)



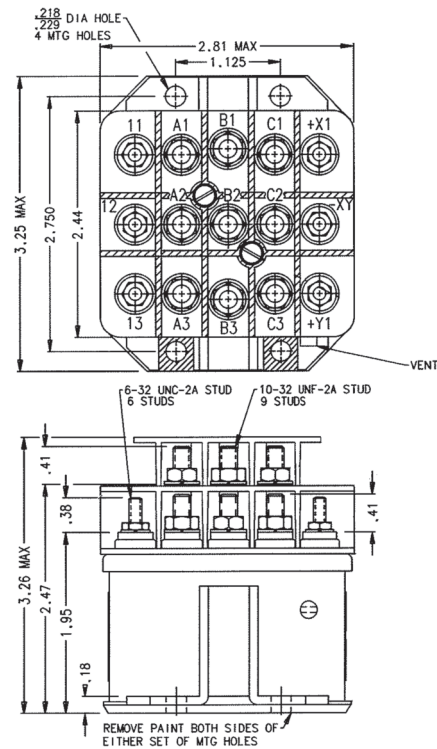
Mounting Style A



Mounting Style B



Mounting Style C

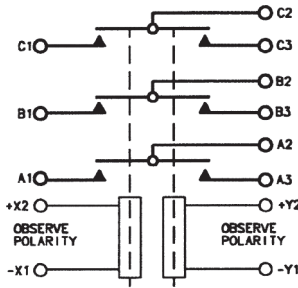


Mounting Style D

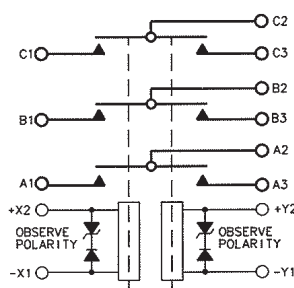
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

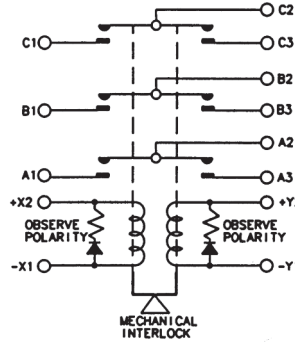
Circuit Configurations (Consult factory for other available circuit configurations)



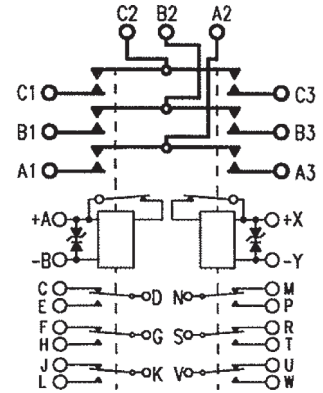
Circuit Configuration 1



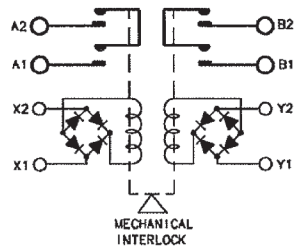
Circuit Configuration 2



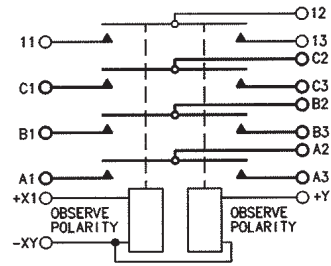
Circuit Configuration 3



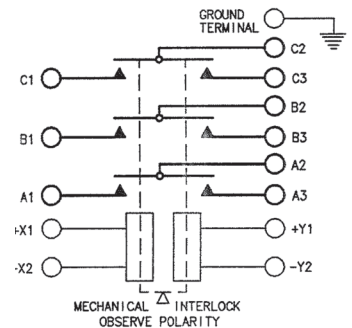
Circuit Configuration 4



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

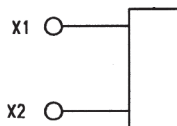
Operating Voltage, Nom. — 28 Vdc

Pickup Voltage, Max. — 18 Vdc

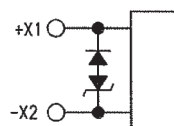
Dropout Voltage — 1.5 to 7 Vdc

Coil Current, Holding, Max. — 0.5 Amp

Coil Type



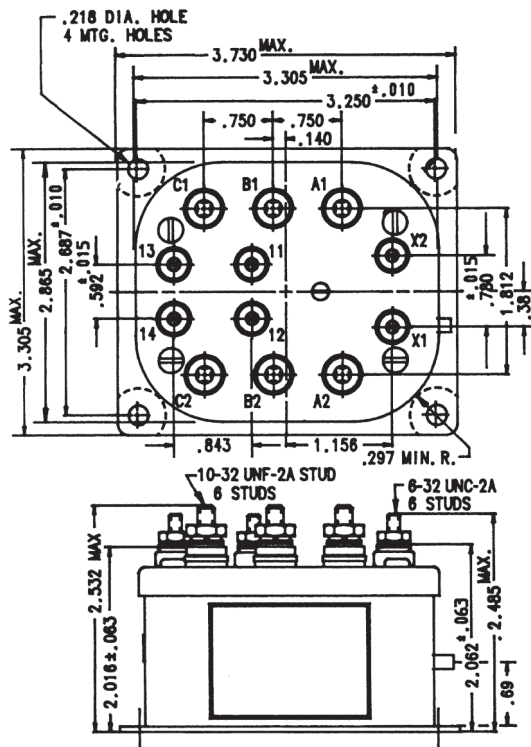
A — Continuous



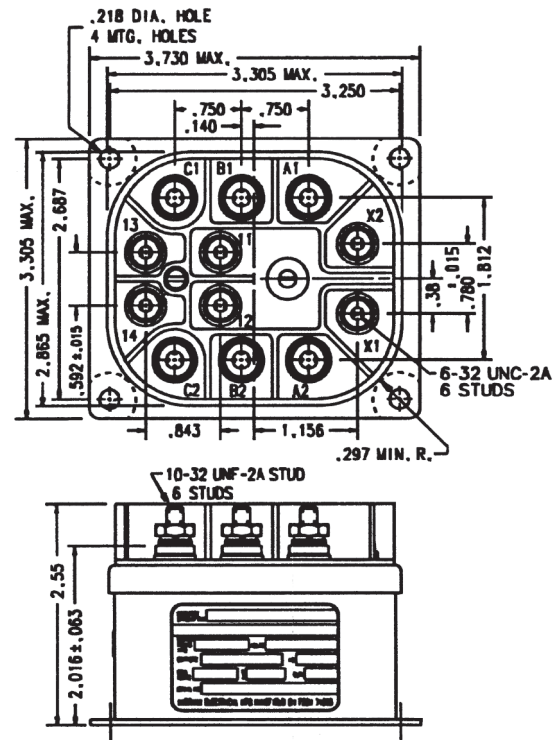
B — Continuous w/Suppression

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

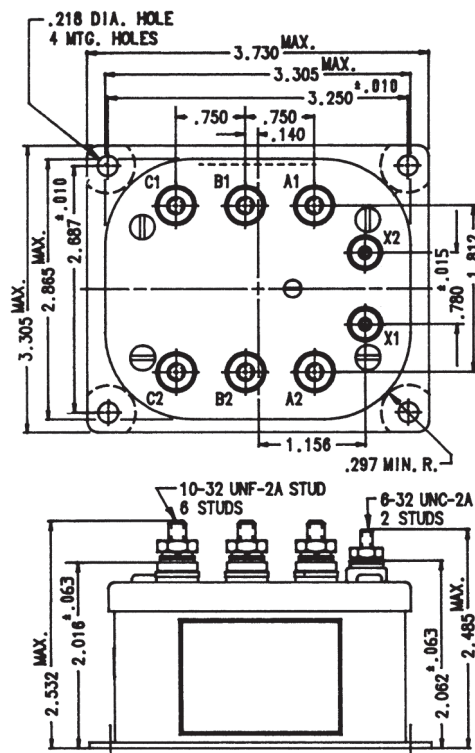
BH-316 Series, Rated up to 50 Amps, 115/200 VAC, 400 Hz or 28 Vdc (Continued)



Mounting Style A



Mounting Style B

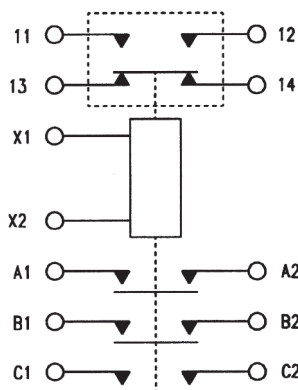


Mounting Style C

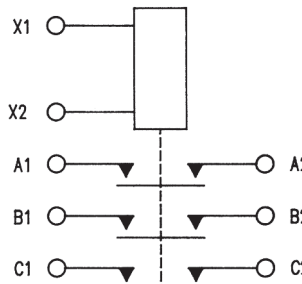
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

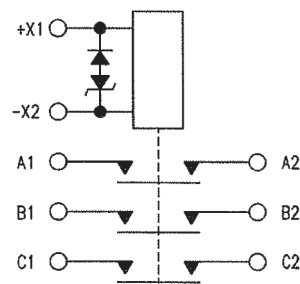
Circuit Configurations (Consult factory for other available circuit configurations)



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 |

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. —

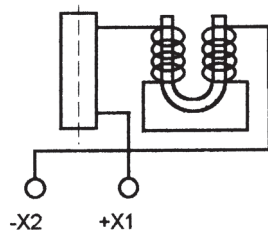
1.5 to 7 Vdc

Coil Current @ 29 Vdc Max. @

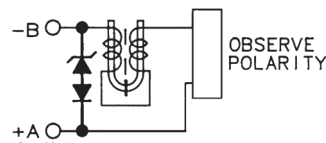
25°C — 0.5 Amps

Inrush — 5 Amps

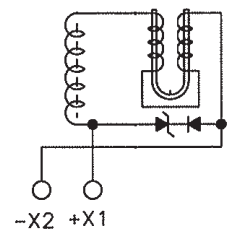
Coil Type



A — Continuous



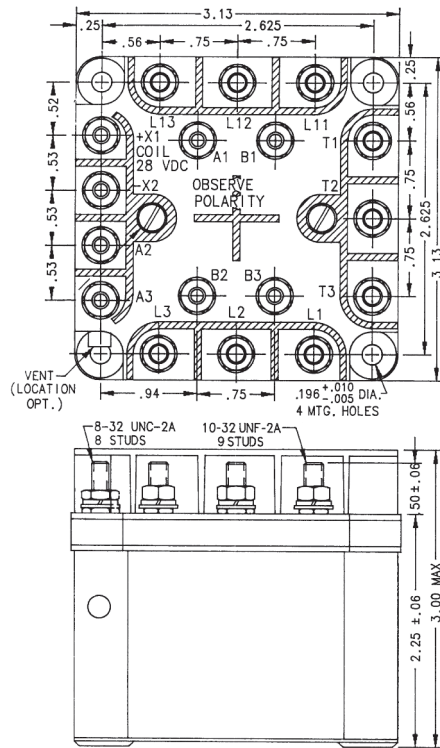
B — Continuous with Suppression



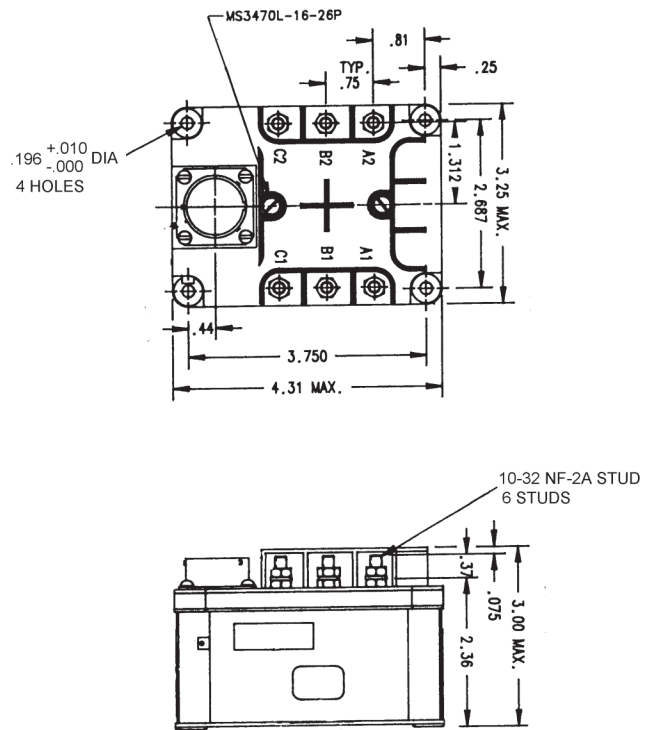
C — Continuous with Suppression

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)

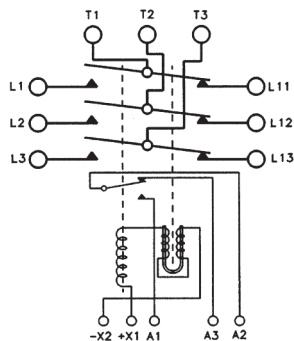


Mounting Style A

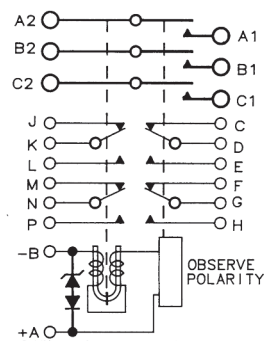


Mounting Style B

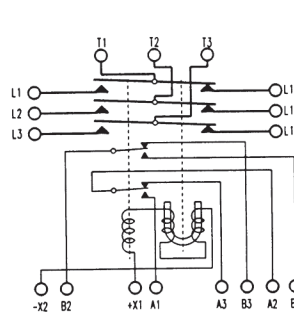
Circuit Configurations (Consult factory for other available circuit configurations)



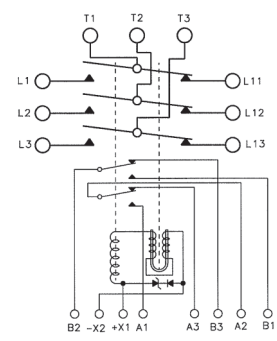
Circuit Configuration 1



Circuit Configuration 2



Circuit Configuration 3



Circuit Configuration 4

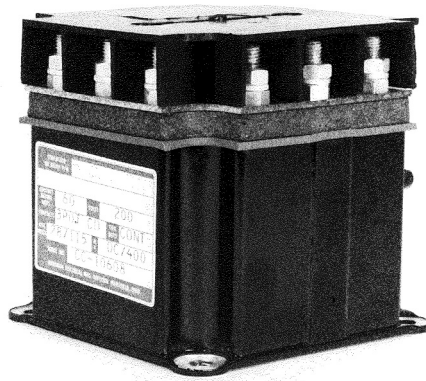
| HARTMAN Part Number | Construction Type | Mounting Style | Coil Type | Circuit Config. | TE Part Number |
|---------------------|-------------------|----------------|-----------|-----------------|----------------|
| B-138S | Gasket/Vented | B | B | 2 | 1616002-5 |
| B-138XEH | Gasket/Vented | A | C | 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. —

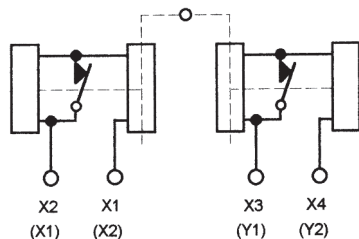
1.5 to 7 Vdc

Coil Current @ 29 Vdc Max. @

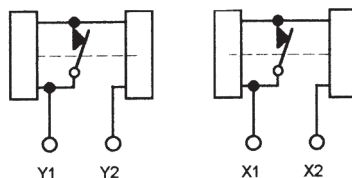
25°C — 0.35 Amps

Inrush — 5 Amps

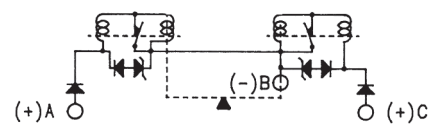
Coil Type



A — Continuous



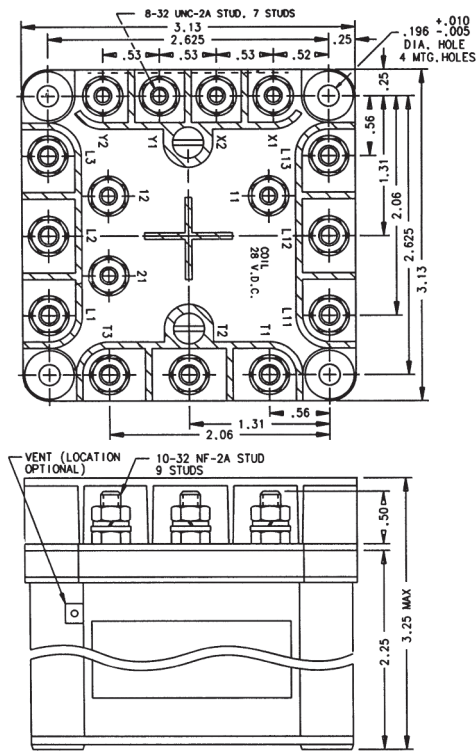
B — Continuous



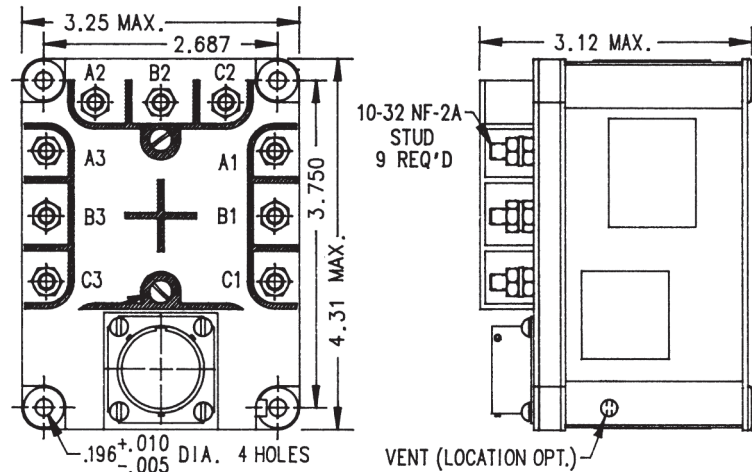
C — Continuous w/Suppression

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)

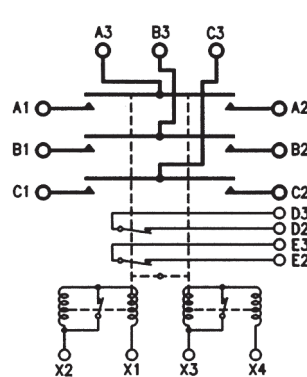


Mounting Style A

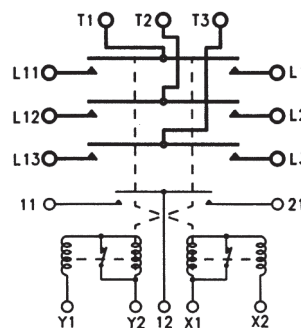


Mounting Style B

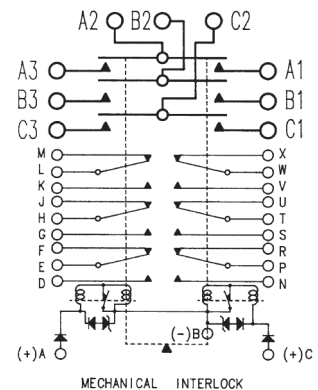
Circuit Configurations (Consult factory for other available circuit configurations)



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. —

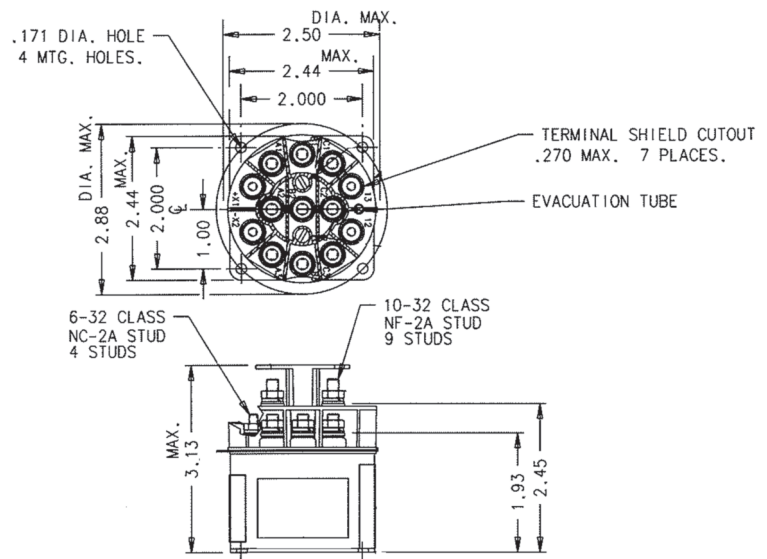
1.5 to 7 Vdc

Coil Resistance ±20% @ 25°C —

126 Ohms

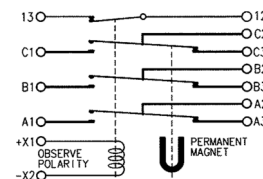
Coil Current @ 25°C, Max. —

.28 Amp



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

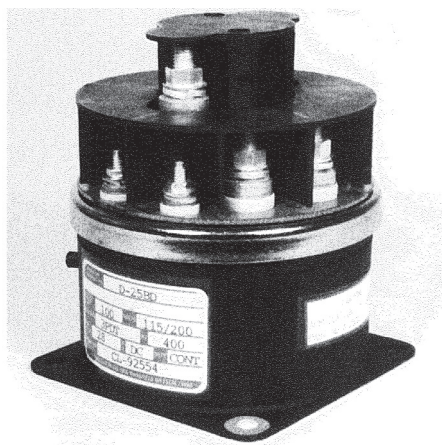
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

| 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

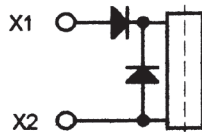
Vdc — 1.5 to 7 Vdc

Coil Resistance ±20% @ 25°C —

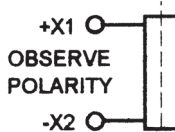
VAC 400 Hz — N/A

Vdc — 175 Ohms

Coil Type



A — AC



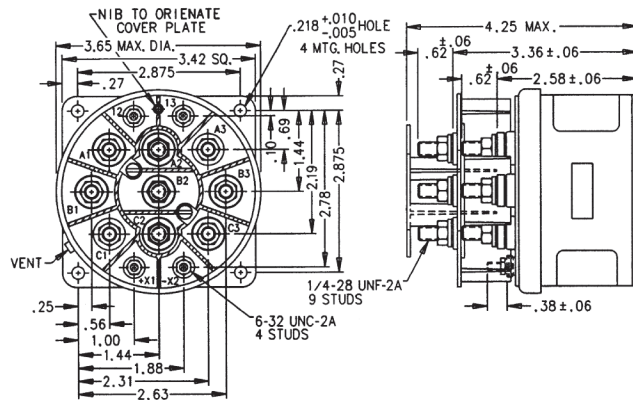
B — Continuous



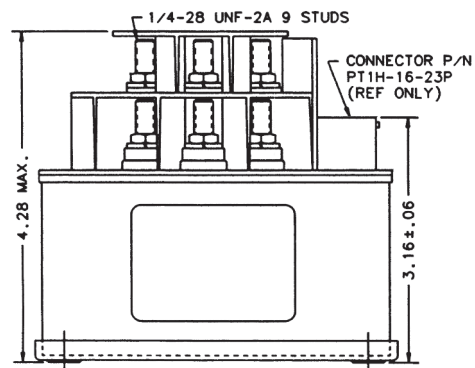
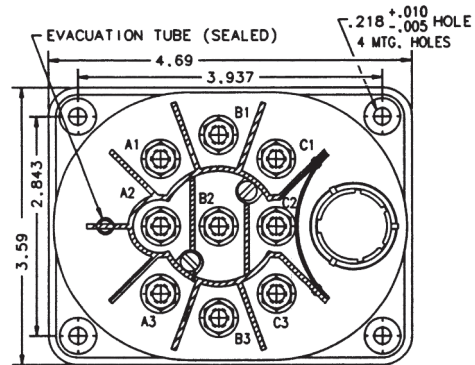
C — Continuous with Suppression

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

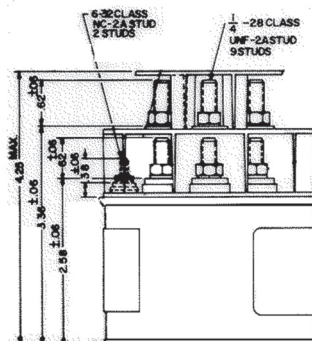
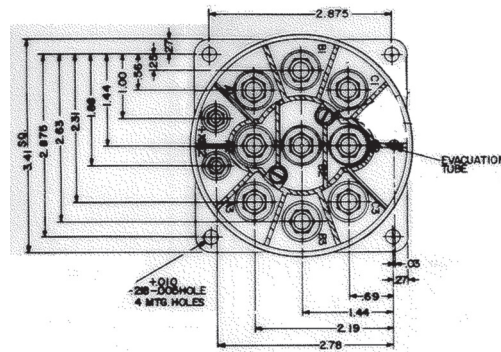
D25, DH25 and DHR25 Series, Rated up to 100 Amps, 115/200 VAC, 400 Hz (Continued)



Mounting Style A



Mounting Style B

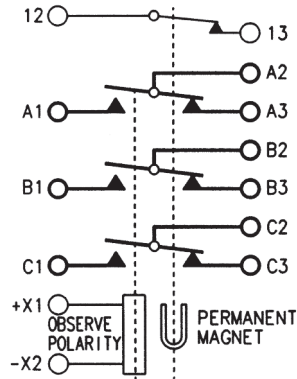


Mounting Style C

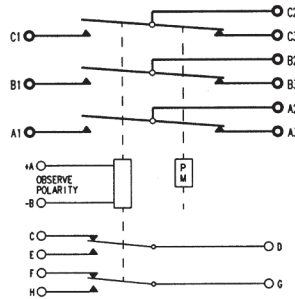
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

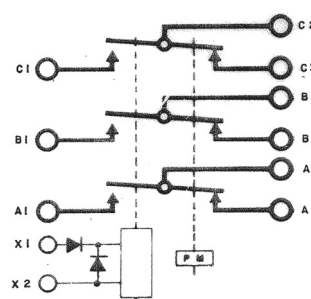
Circuit Configurations (Consult factory for other available circuit configurations)



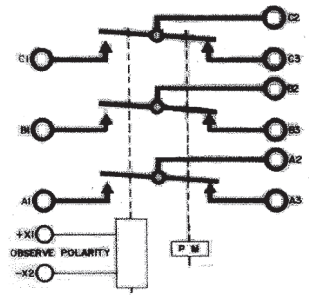
Circuit Configuration 1



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

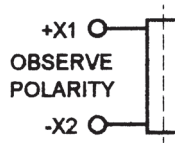
Dropout Voltage @ 25°C, Max. —

1.5 to 7 Vdc

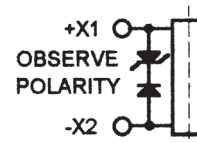
Coil Resistance ±20% @ 25°C —

113 Ohms

Coil Type



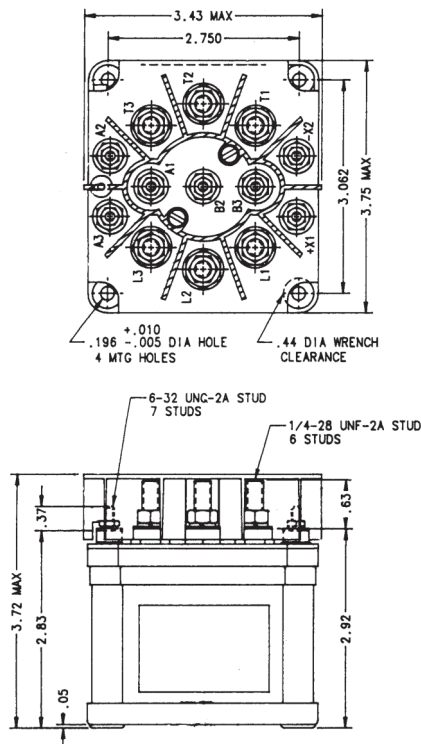
A — Continuous



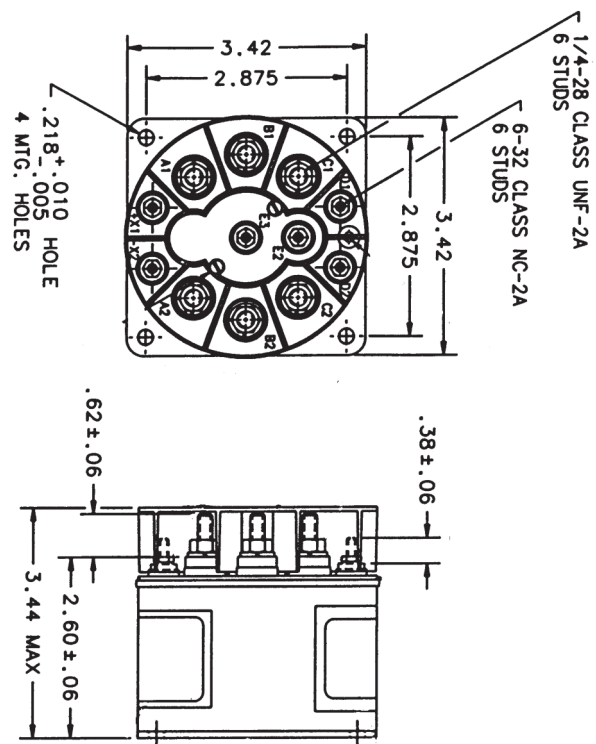
B — Continuous with Suppression

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)

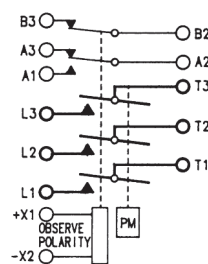


Mounting Style A

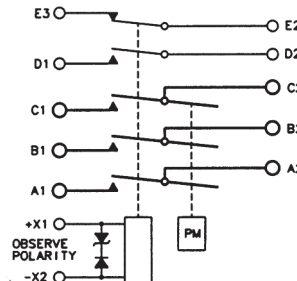


Mounting Style B

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

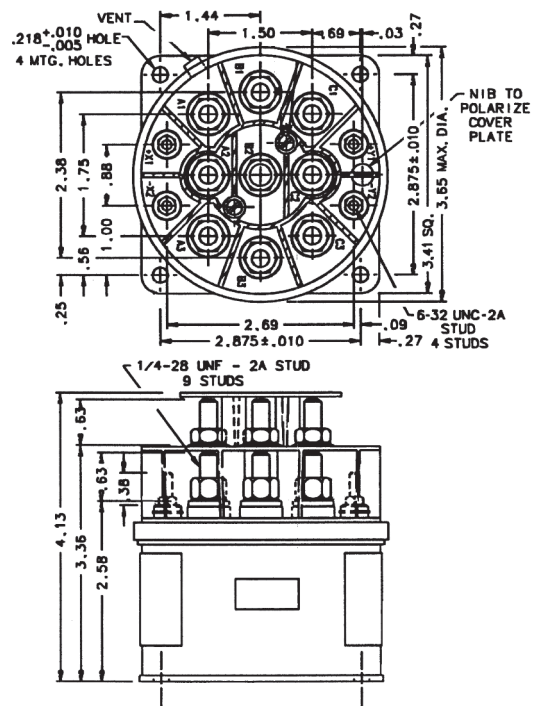
Duty Cycle — Continuous

Operating Voltage, Nom. — 28 Vdc

Pickup Voltage @ 71°C, Max. —
18 Vdc

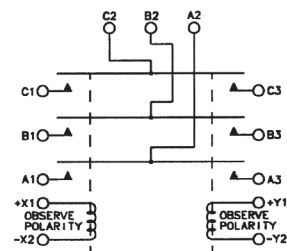
Dropout Voltage, Max. —
1.5 to 7 Vdc

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

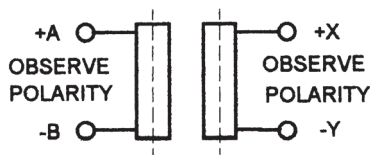
Coil Type B — 100 Ohms

Coil Type C — 132 Ohms

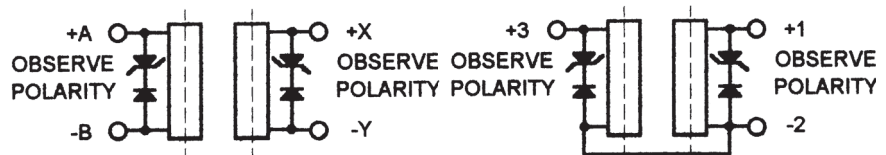
Coil Current @ 25°C, Max. —

.350 Amp

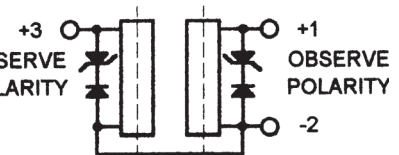
Coil Type



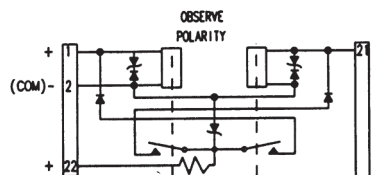
A — Continuous



B — Continuous with Suppression



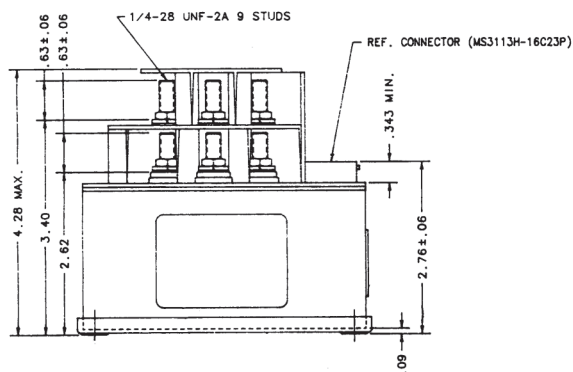
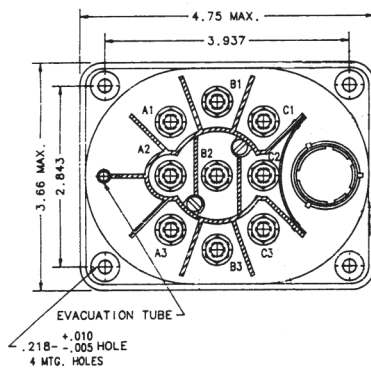
C — Continuous with Suppression



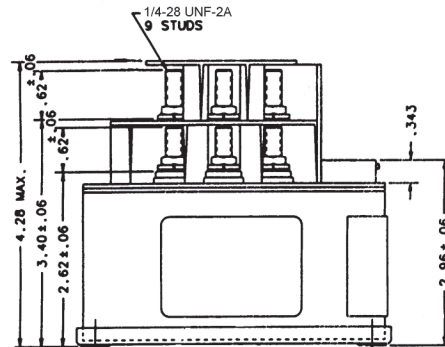
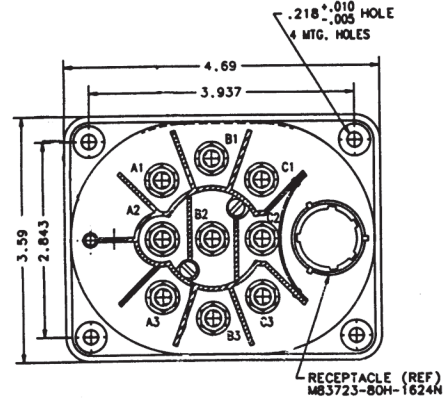
D — Latching

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

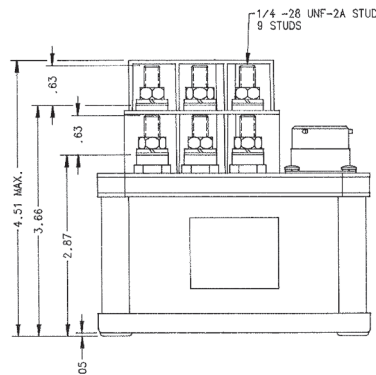
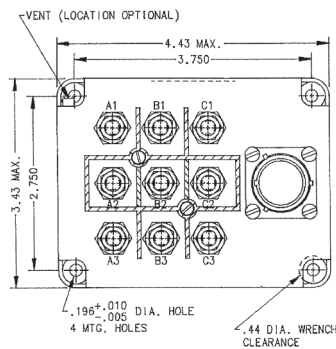
D-31, DH-31, and DHL-31 Series, Rated up to 120 Amps, 115/200 VAC, 400 Hz (Continued)



Mounting Style A



Mounting Style B

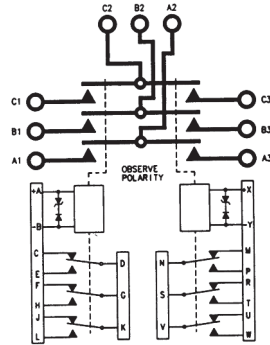


Mounting Style C

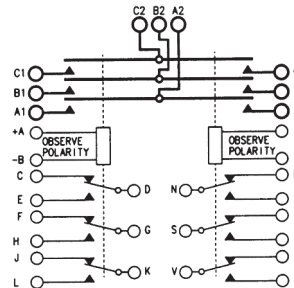
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

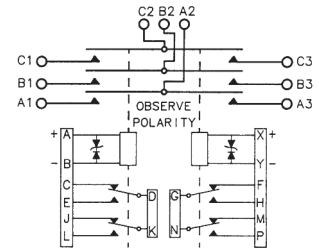
Circuit Configurations (Consult factory for other available circuit configurations)



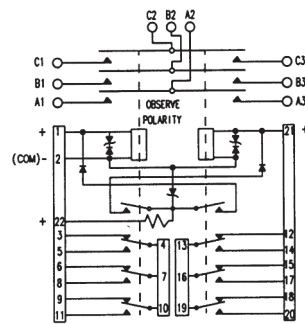
Circuit Configuration 1



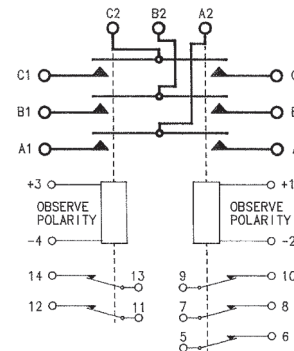
Circuit Configuration 2



Circuit Configuration 3



Circuit Configuration 4



Circuit Configuration 4

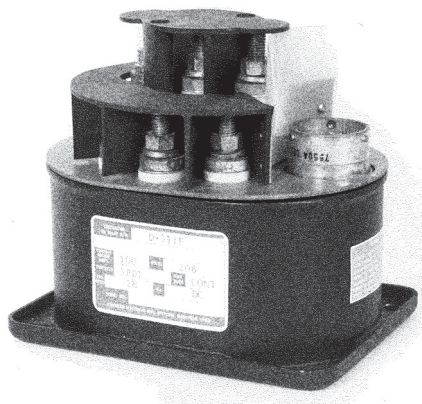
| HARTMAN Part Number | Construction Type | Mounting Style | Coil Type | Circuit Config. | TE Part Number |
|---------------------|---------------------|----------------|-----------|-----------------|----------------|
| D-31DB | Gasket/Vented | A | B | 1 | 1616049-2 |
| D-31TH | Gasket/Vented | C | A | 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. —

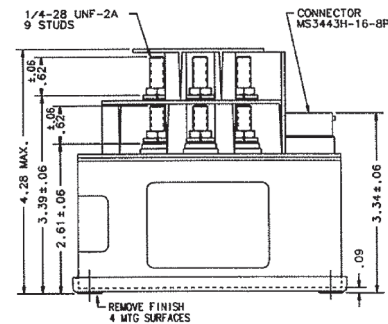
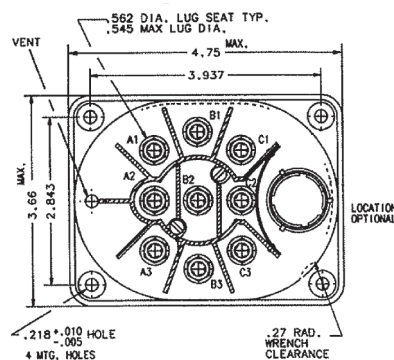
18 Vdc

Dropout Voltage @ 25°C —

2.5 to 7 Vdc

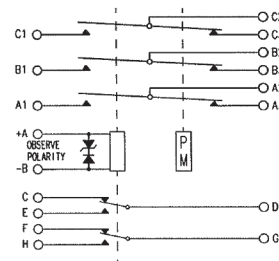
Coil Resistance @ 25°C —

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

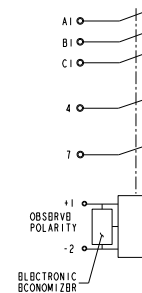
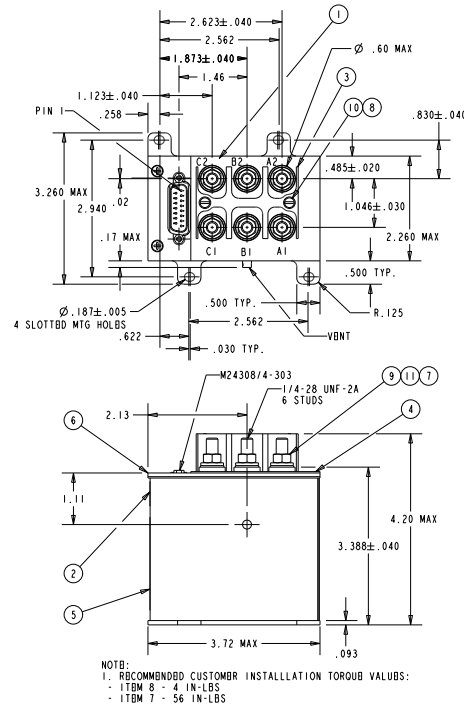
Altitude — 50,000 ft

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

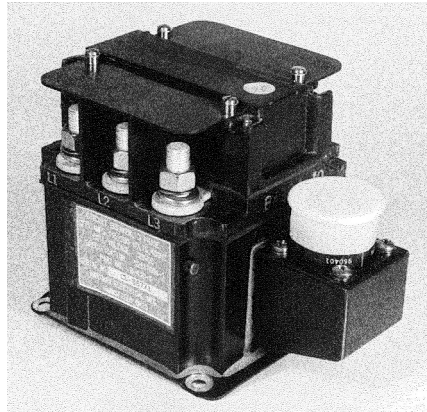
1. Other aux contact configurations available. Consult Factory.
2. Units with current ratings to 175A are available. Consult Factory.
3. Units with rupture ratings to 1750A are available. Consult Factory.

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

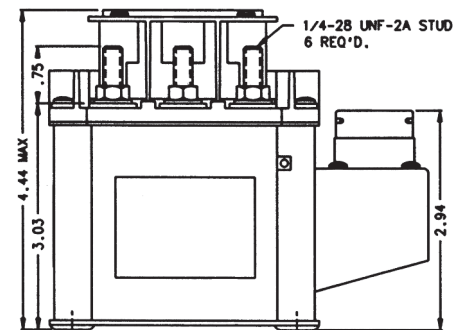
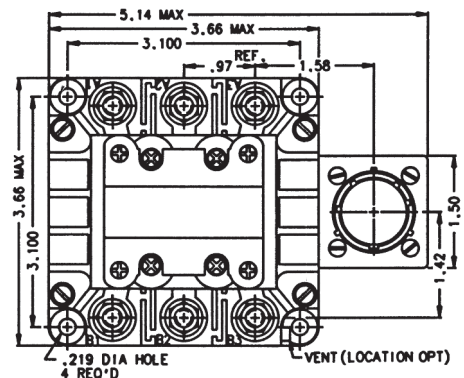
Coil Characteristics

Duty Cycle — Continuous, self-deenergizing

Operating Voltage, Max. — 30 Vdc

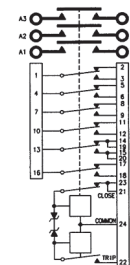
Close Voltage @ 15 to 30 Vdc —
Resistance — 4.4 +10% Ohms
Current — 5 Amp Max.

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

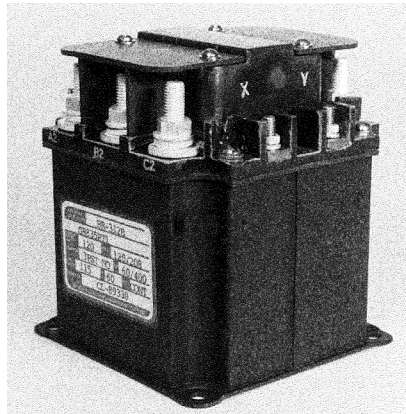
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

| 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

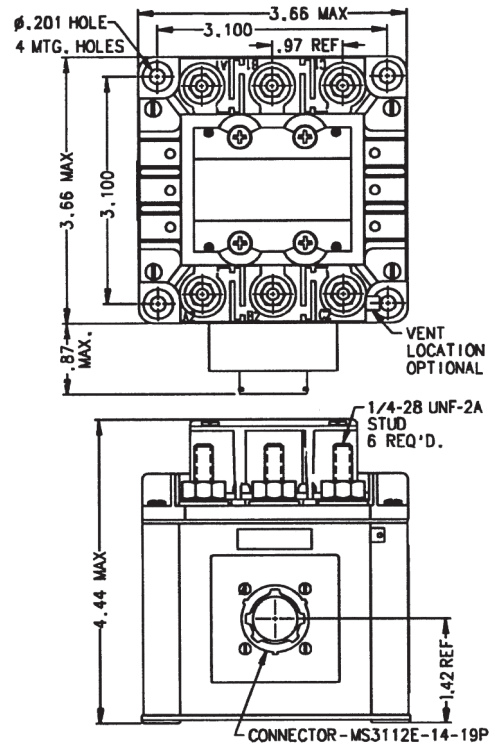
Duty Cycle — Continuous, economizing

Operating Voltage, Nom. — 28 Vdc

Pickup Voltage — 18 Vdc

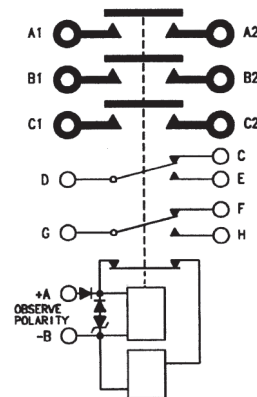
Dropout Voltage — B312DB — 1.5 to 7 Vdc
B312CH — 1 to 7 Vdc

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

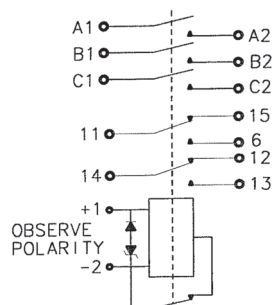
Pickup Voltage — 18 Vdc

Dropout Voltage —

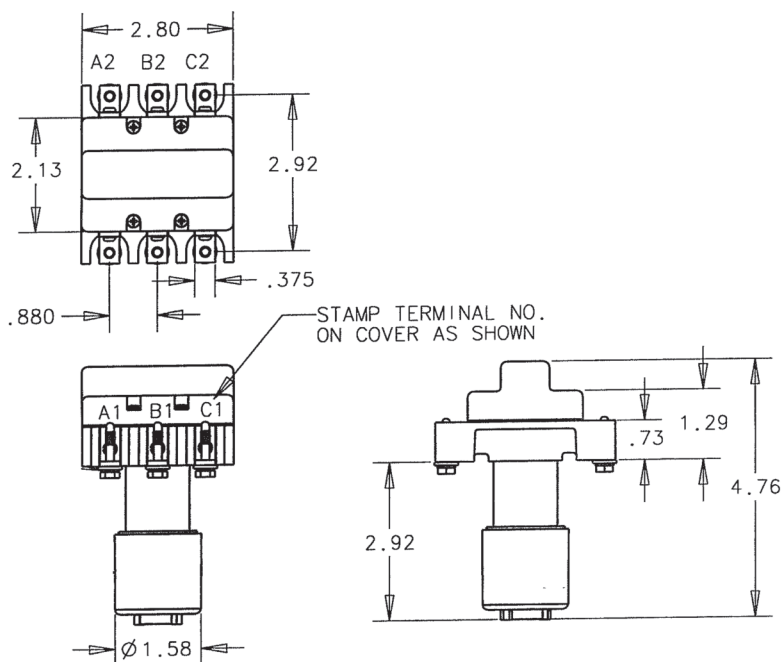
1.0 to 7 Vdc

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

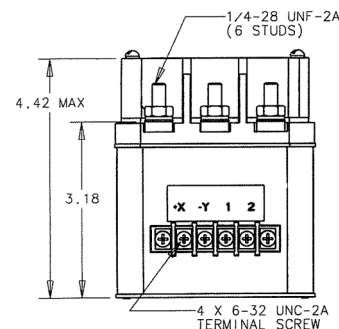
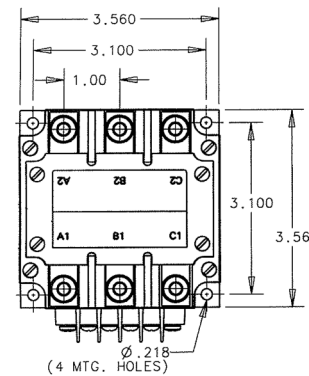
Operating Voltage, Nom. — 24 Vdc

Pickup Voltage, Max. — 18 Vdc

Dropout Voltage — 1 to 10 Vdc

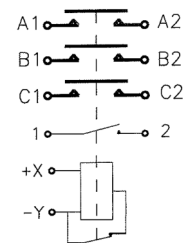
Coil Resistance — 240A

Rupture — 2400A



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

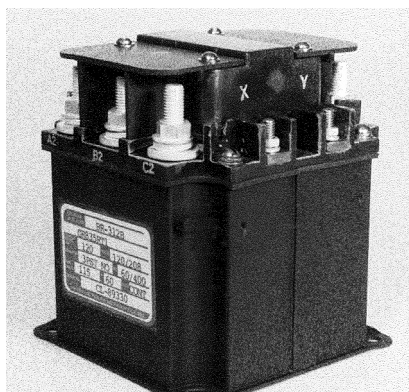
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

| 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

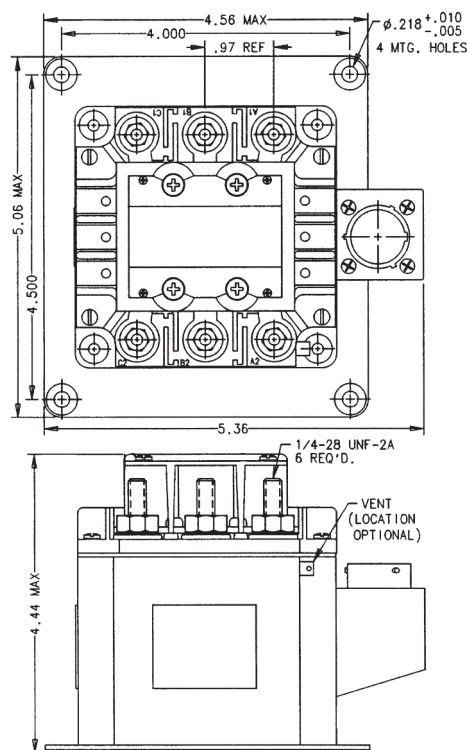
Pickup Voltage, Max. — 18 Vdc

Dropout Voltage — 1 to 7 Vdc

Coil Resistance —

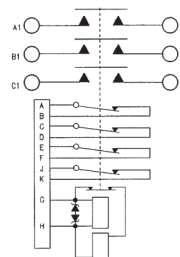
Pickup — 12 Ohms \pm 20%

Holding — 60 Ohms \pm 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

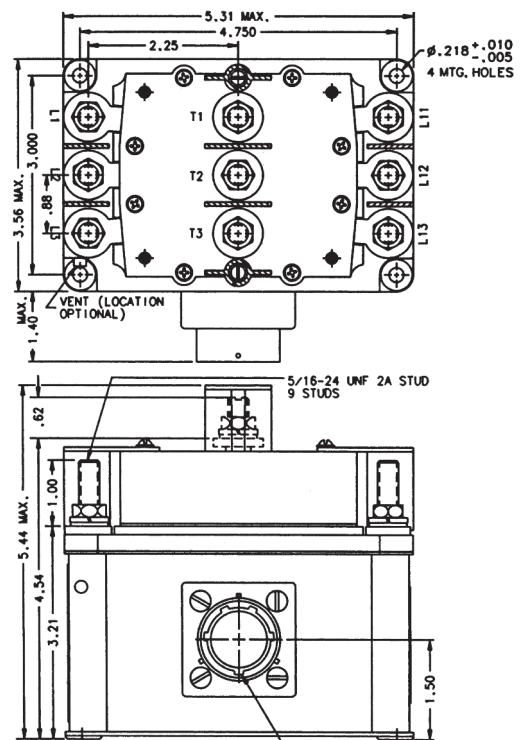
Operating Voltage, Nom. — 28 Vdc

Pickup Voltage, Max. — 18 Vdc

Dropout Voltage —

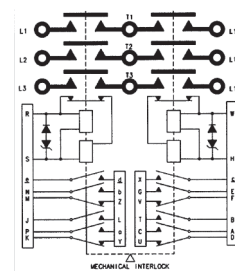
R-S Coil — 14 Vdc

W-H Coil — 7 Vdc



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

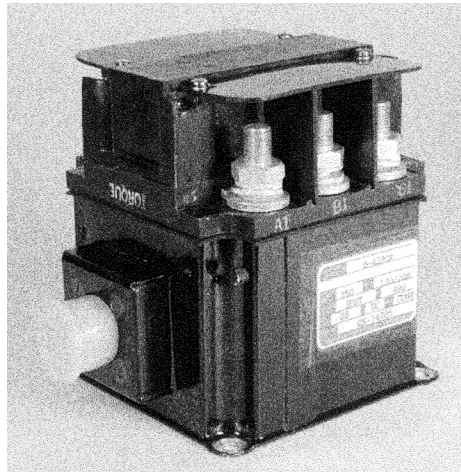
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

| 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

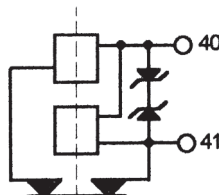
Coil Current Inrush —

Coil Type A — 6 Amps
Coil Type B — 2.7 Amps

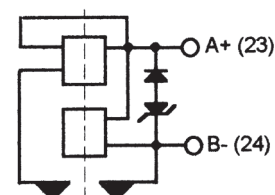
Coil Current Holding —

Coil Type A — 0.6 Amps
Coil Type B — 0.56 Amps

Coil Type



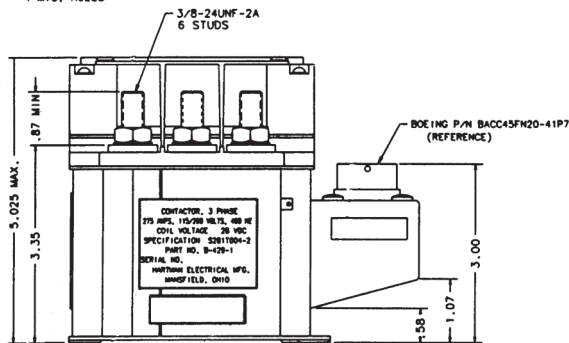
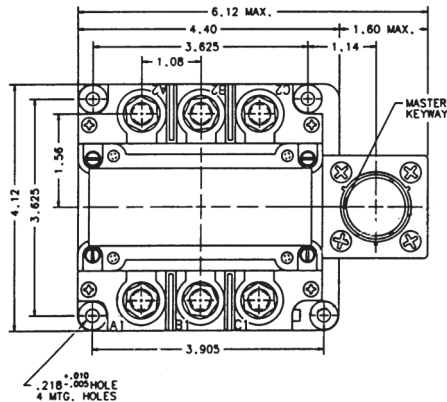
A — Continuous, Economized with Suppression



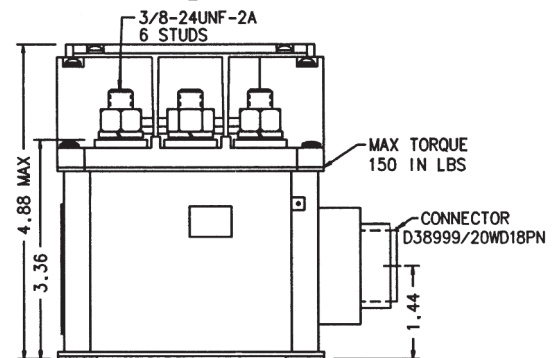
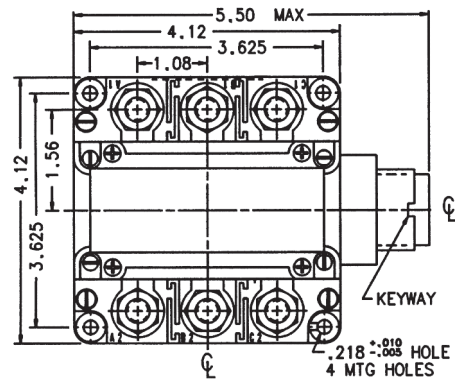
B — Continuous, Economized with Suppression

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

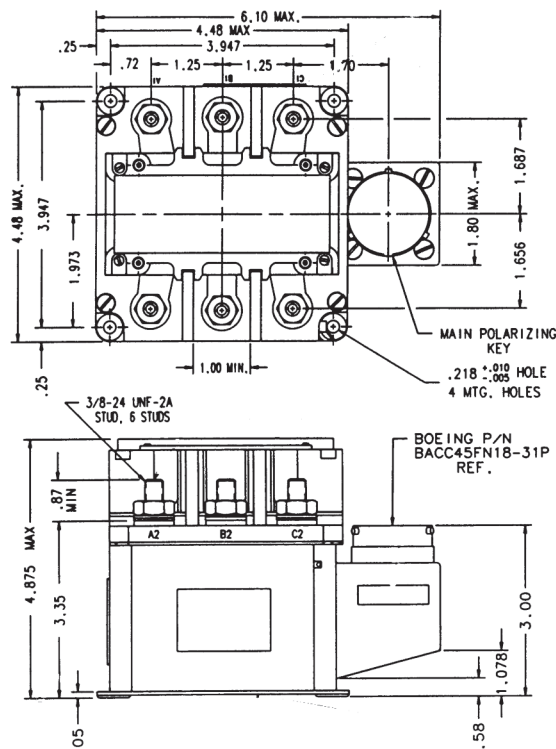
B-429 Series, 260/350 Amps, 115/200 VAC or 120/208 VAC (Continued)



Mounting Style A



Mounting Style B

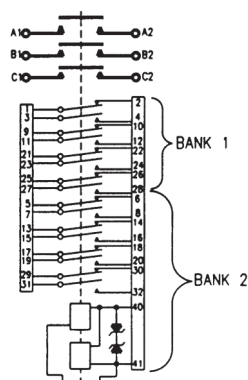


Mounting Style C

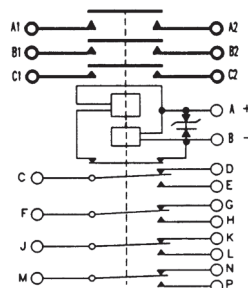
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

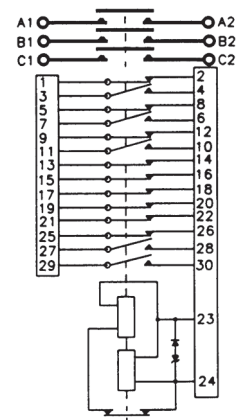
Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 2



Circuit Configuration 3

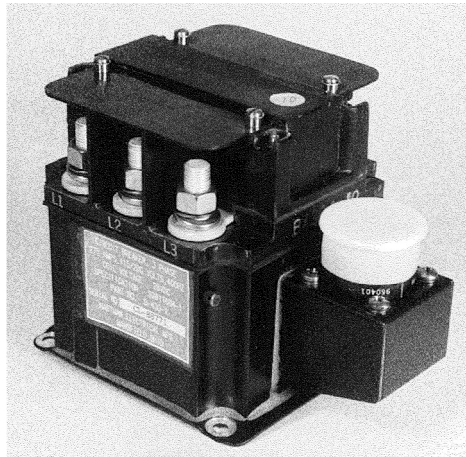
| HARTMAN Part Number | Construction Type | Mounting Style | Coil Type | Circuit Config. | TE Part Number |
|---------------------|-------------------|----------------|-----------|-----------------|----------------|
| B-429W | Gasket/Vented | B | B | 3 | 1616005-6 |
| B-429-1 | Gasket/Vented | A | A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

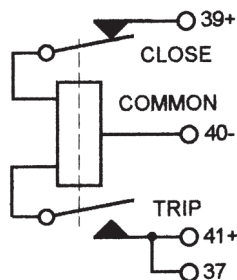
B-430Z — 29 Vdc

Coil Current Closing, Max. —

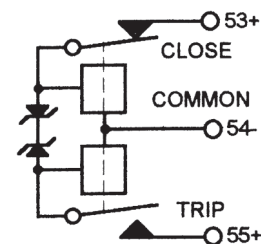
6 Amps

Coil Current Trip, Max. — 6 Amps

Coil Type



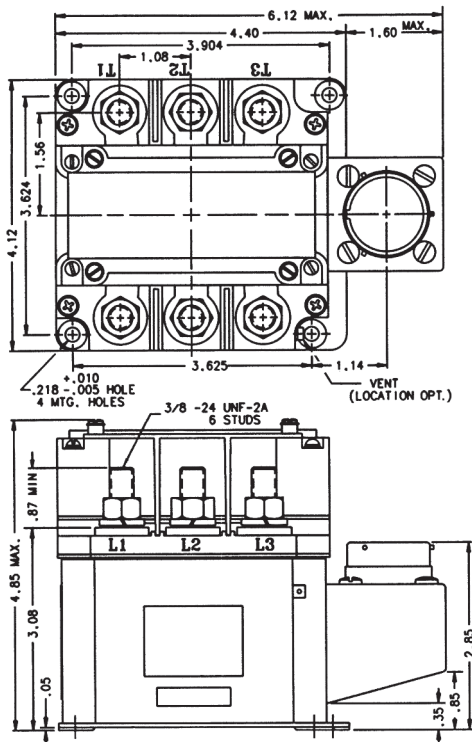
A — Continuous, Self-Deenergizing



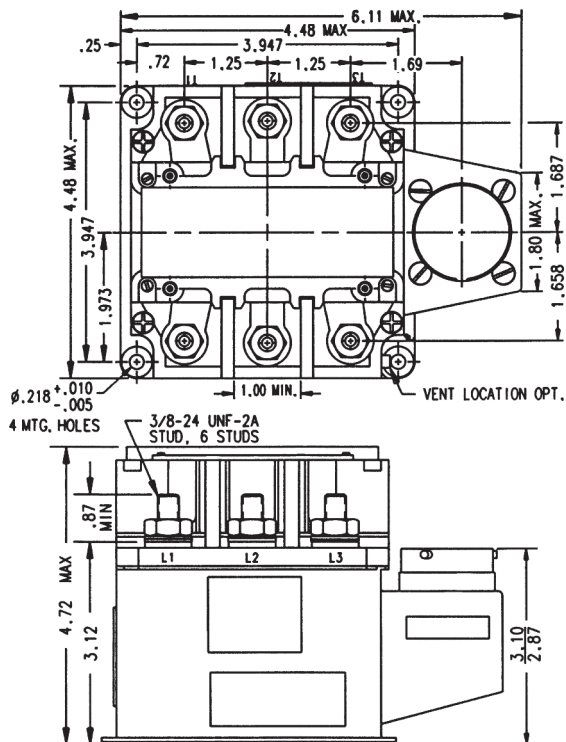
B — Continuous, Self-Deenergizing with Suppression

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)

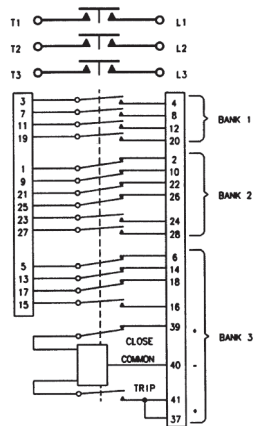


Mounting Style A

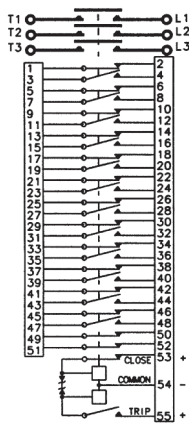


Mounting Style B

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 2

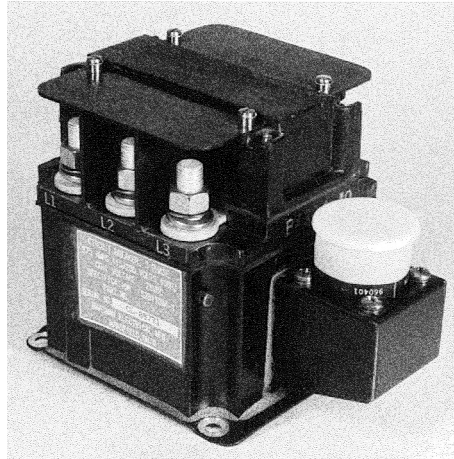
| HARTMAN Part Number | Construction Type | Mounting Style | Coil Type | Circuit Config. | TE Part Number |
|---------------------|-------------------|----------------|-----------|-----------------|----------------|
| B-430-1 | Gasket/Vented | A | A | 1 | 1616023-1 |
| B-430Z | Gasket/Vented | B | B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

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

B-484 Series, Rated up to 500 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, 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

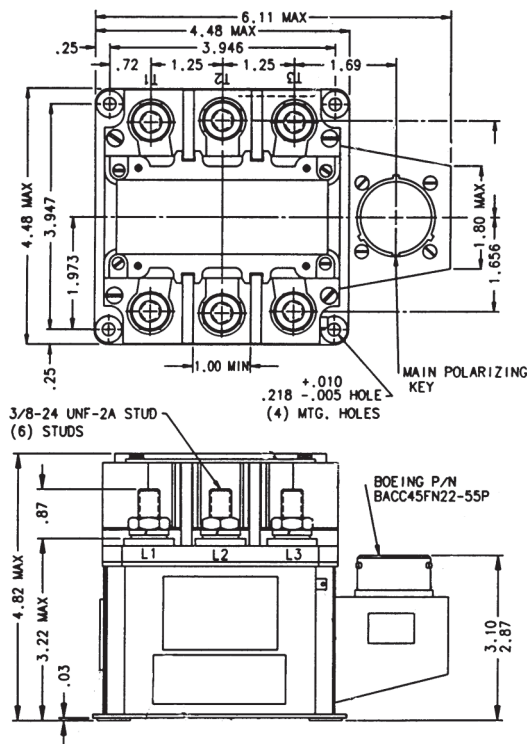
Duty Cycle — Continuous, self-deenergizing

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

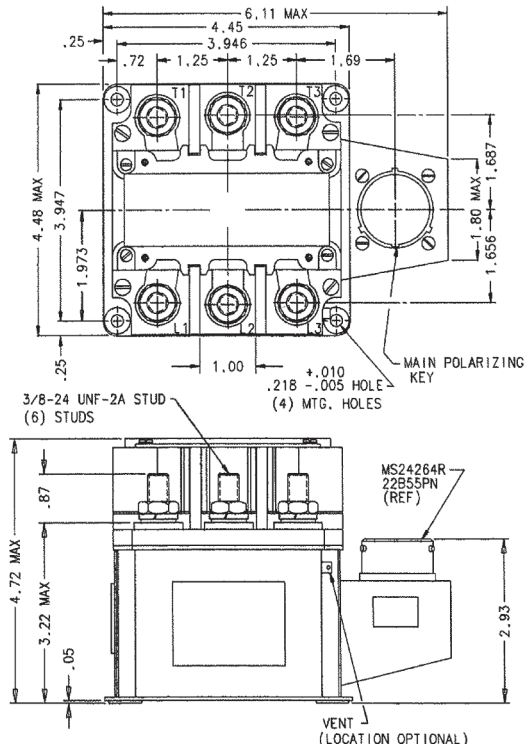
Trip Voltage — Min. — 15 Vdc
Max. — 29 Vdc

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)

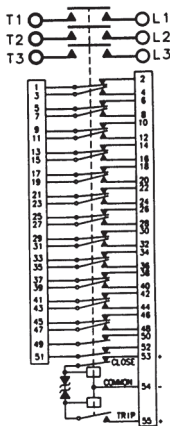


Mounting Style A



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 |
| | | 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 |
| 50 | AC | 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 |
| | | 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 |
| | | 115 | 3PST NO | Side Stable | — | 28 | Hermetic | Cont. | — | BH-316 | 1616008-4 |
| 50 | AC | 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 |
| | | 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 |
| 60 | AC | 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 |
| 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 |
| 175 | AC | 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 |
| | | 115/200 | 3ST NO | Side Stable | 2DT | 28 | Gasket | Cont. Econ. | 42 | KA175B3C | 2-1616960-7 |
| 200 | AC | 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

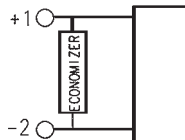
General Characteristics

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

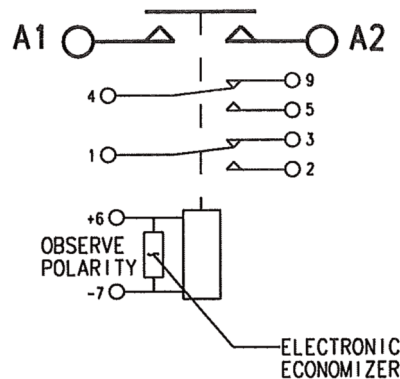
Coil Type



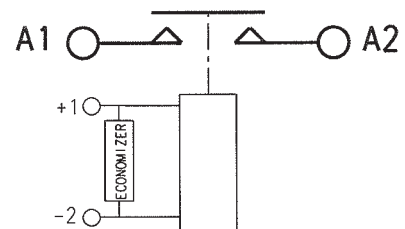
A — Electronic Economized with Suppression

Circuit Configurations

(Consult factory for other available circuit configurations)



Circuit Configuration 1

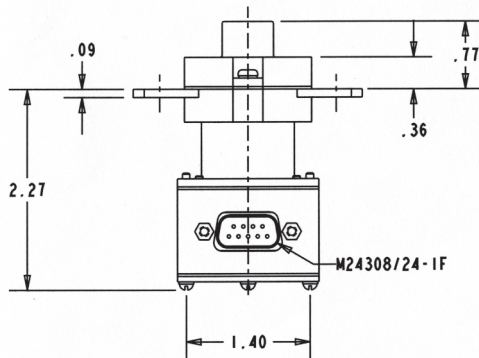
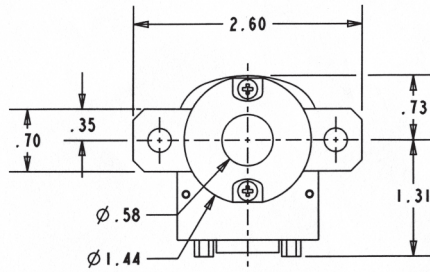


Circuit Configuration 2

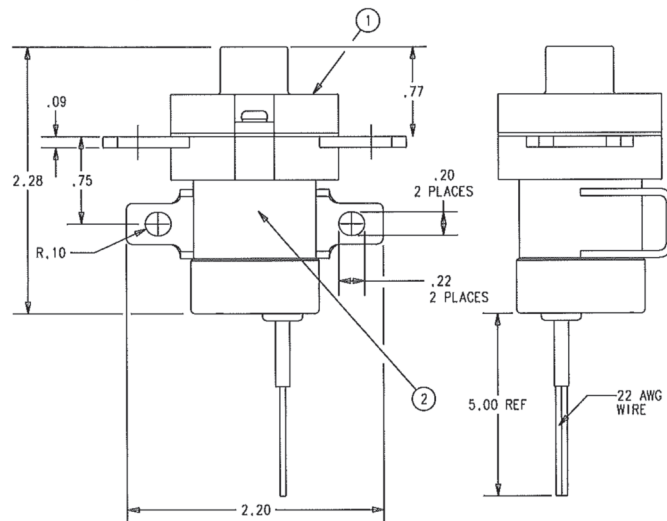
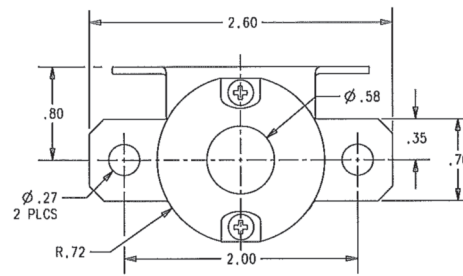
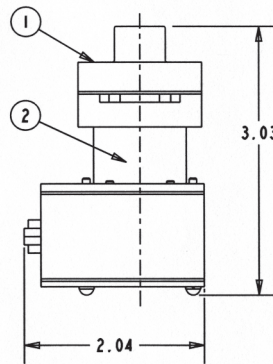
| HARTMAN Part Number | Construction Type | Mounting Style | Coil Type | Circuit Config. | TE Part Number |
|---------------------|-------------------|----------------|-----------|-----------------|----------------|
| K200A1C | Gasket | B | A | 2 | 5-1616970-9 |
| K200B3C02 | Gasket | A | A | 1 | 4-1616968-7 |
| 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)



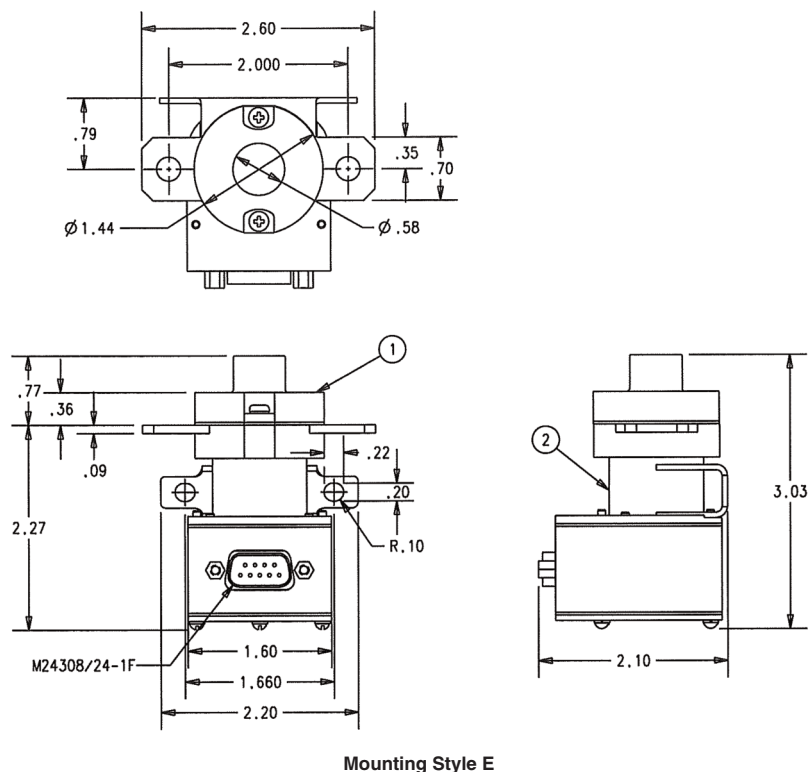
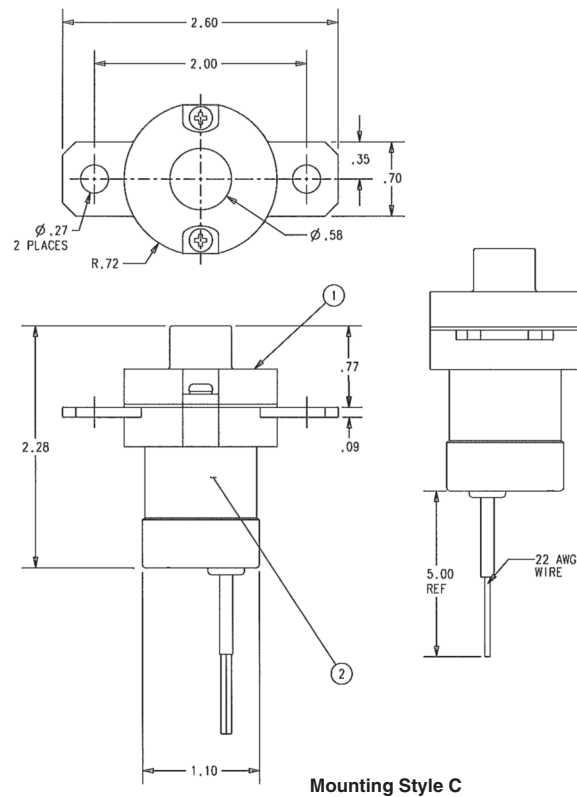
Mounting Style A



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.

Catalog 5-1773450-5
Revised 3-13
www.te.com

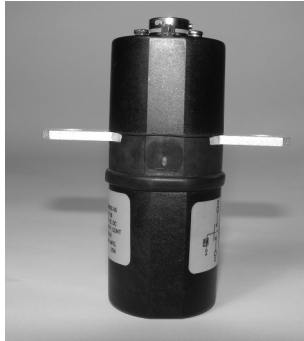
Dimensions are shown for reference purposes only. Specifications subject to change.

Dimensions are in millimeters
unless otherwise specified.

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

For additional support numbers
please visit www.te.com

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. —

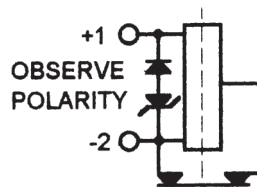
7 Vdc - Economized and continuous duty

5 Vdc - Intermittent duty coil

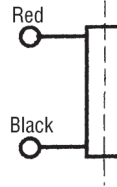
Product Facts

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

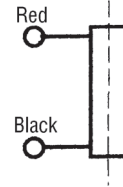
Coil Type



A — Economized with Suppression



B — Continuous

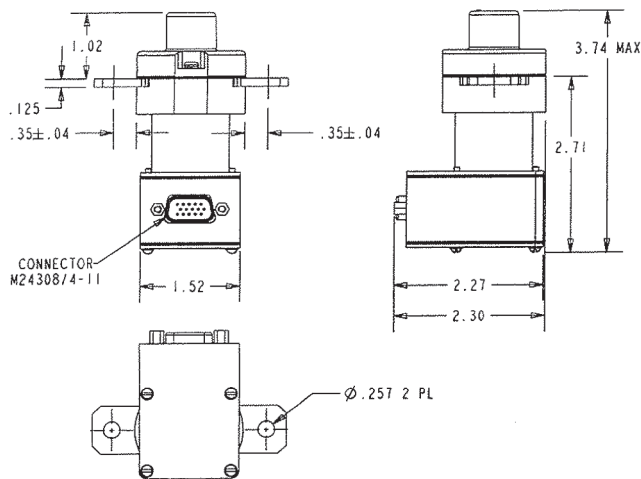
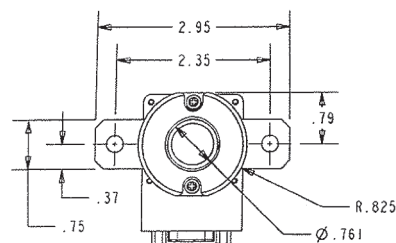


C — Intermittent

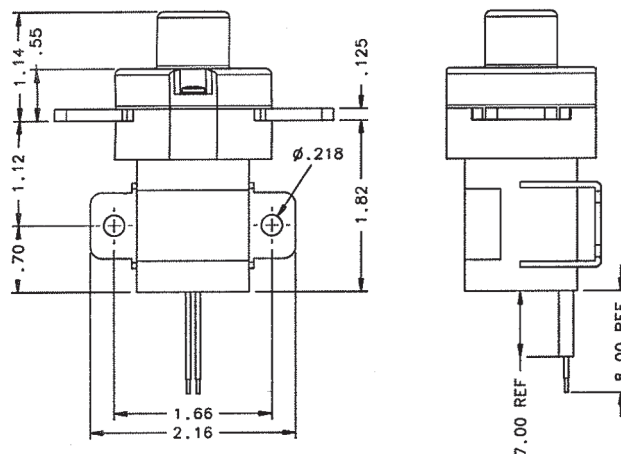
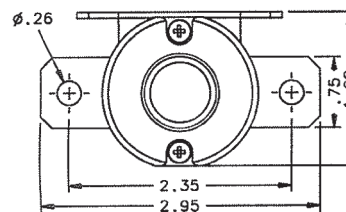
| HARTMAN Part Number | Construction Type | Mounting Style | Coil Type | Circuit Config. | TE Part Number |
|---------------------|-------------------|----------------|-----------|-----------------|----------------|
| K4001A3C | Gasket Sealed | F | A | 4 | 6-1616968-5 |
| K4001B3C | Gasket Sealed | A | 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.

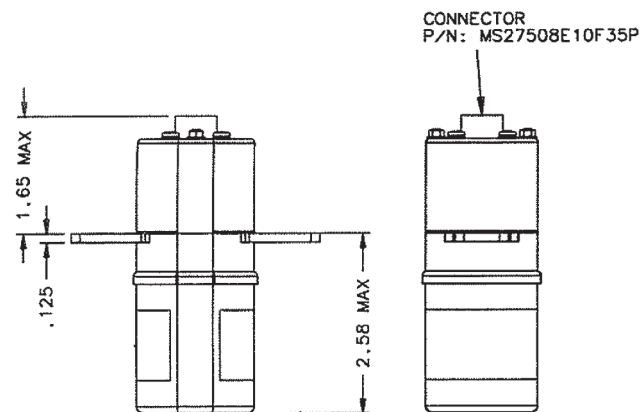
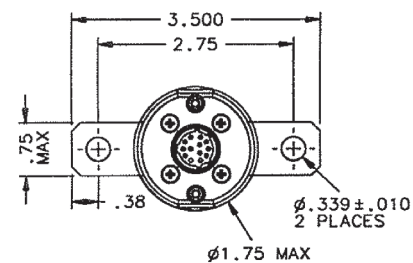
K Series, Rated up to 400 Amps, 28 Vdc (Continued)



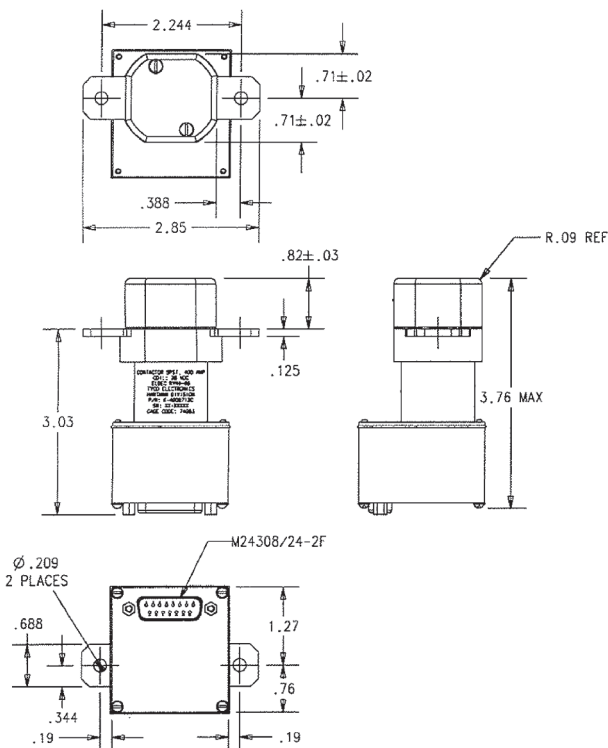
Mounting Style A



Mounting Style B



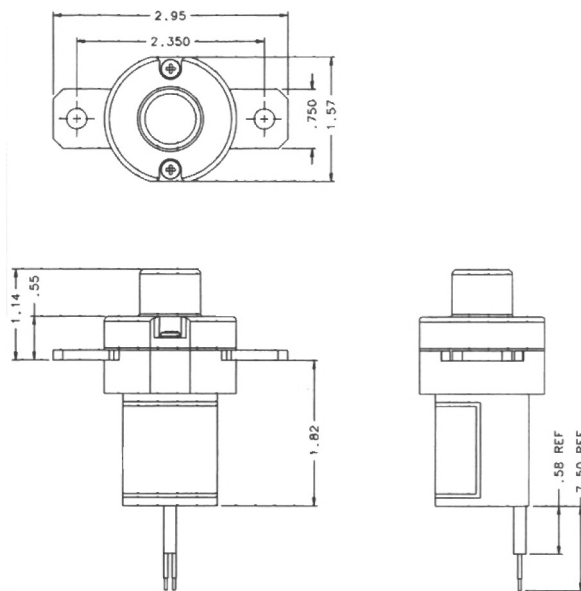
Mounting Style C



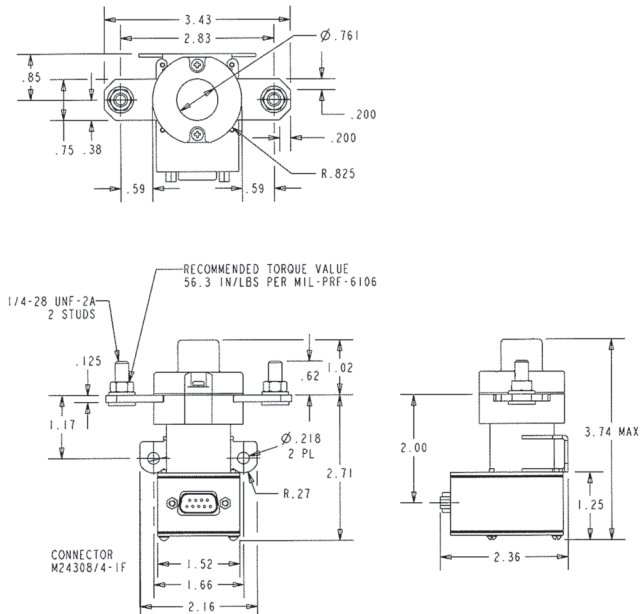
Mounting Style D

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

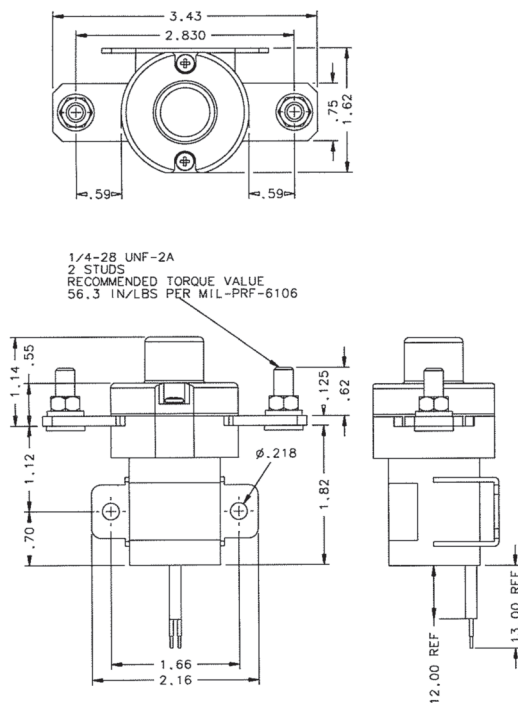
K Series, Rated up to 400 Amps, 28 Vdc (Continued)



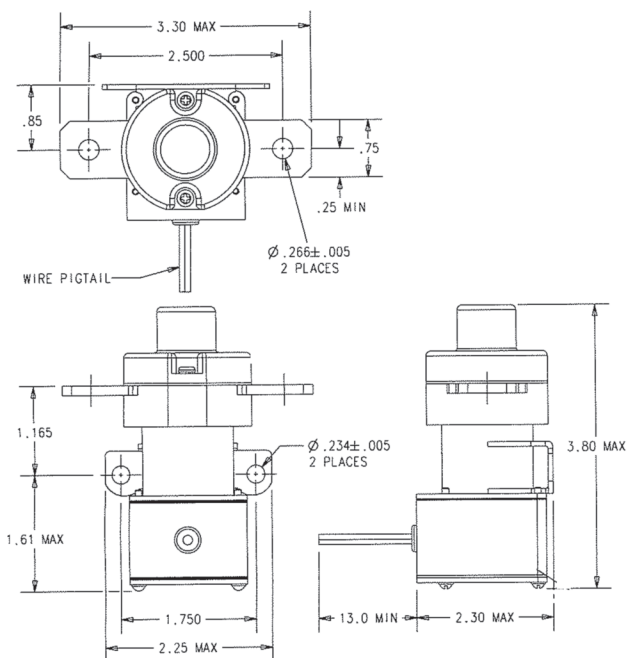
Mounting Style E



Mounting Style F



Mounting Style G

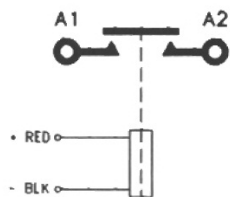


Mounting Style K

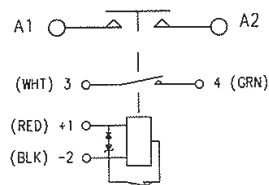
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

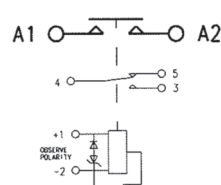
Circuit Configurations (Consult factory for other available circuit configurations)



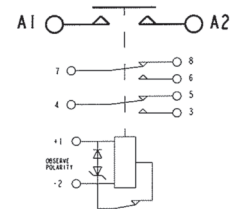
Circuit Configuration 1



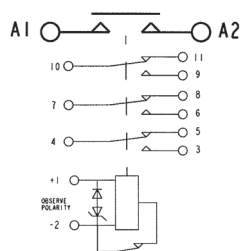
Circuit Configuration 2



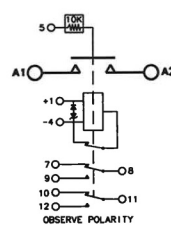
Circuit Configuration 3



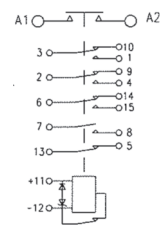
Circuit Configuration 4



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

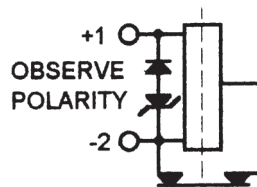
Inrush — 5 Amps

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

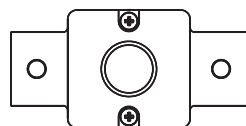
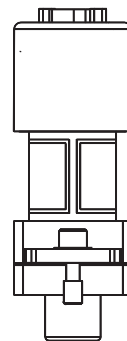
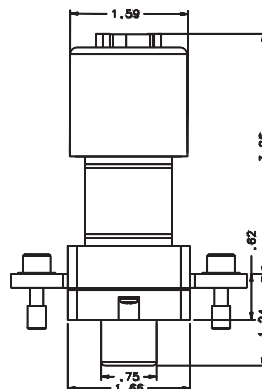
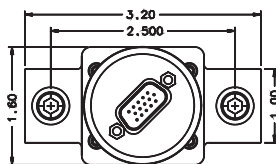
Coil Type



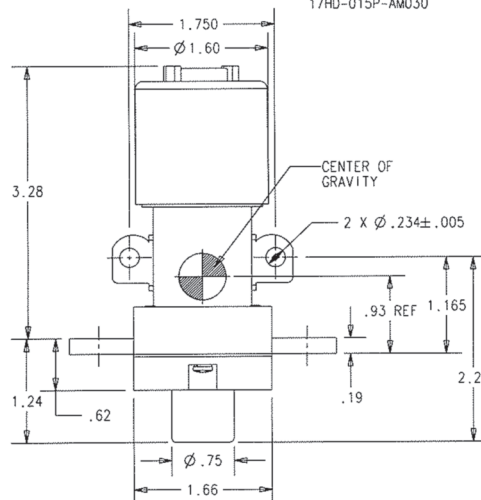
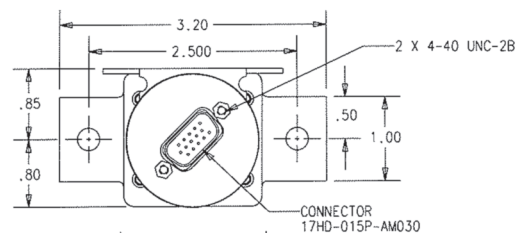
A — Economized with Suppression

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

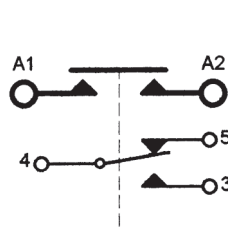


Mounting Style B

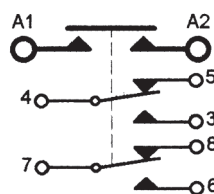
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

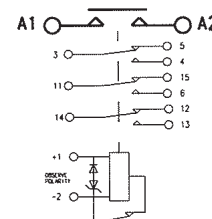
Circuit Configurations (Consult factory for other available circuit configurations)



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

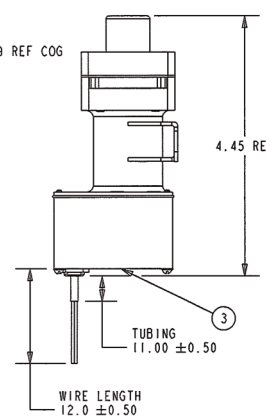
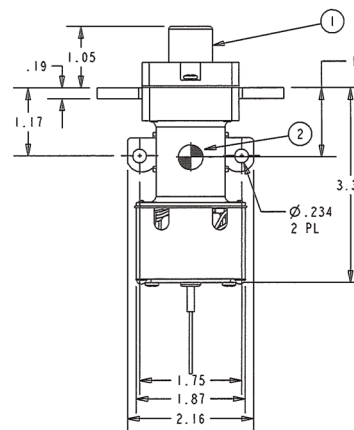
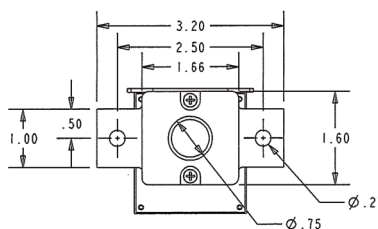
Altitude — 50,000 ft

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

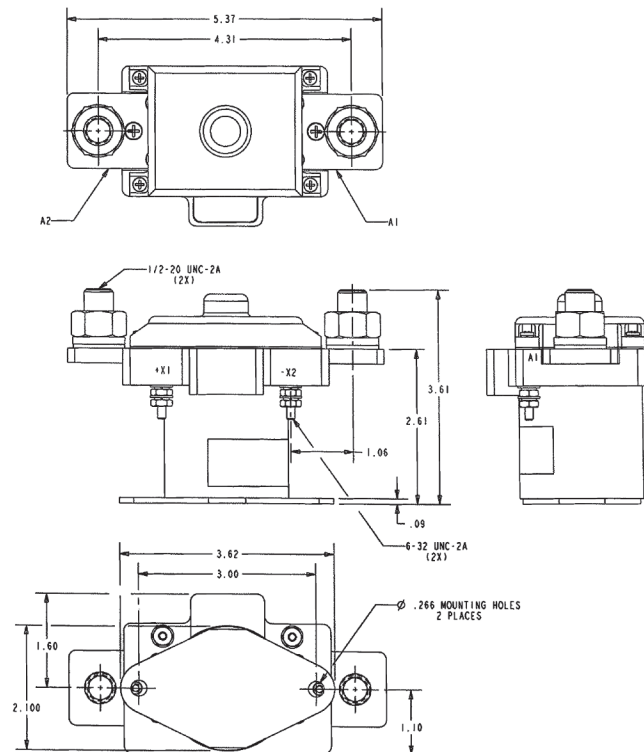
Operating Voltage, Nom. — 28 Vdc

Pickup Voltage, Max. @25°C —
18 Vdc

Dropout Voltage — 1 to 8 Vdc

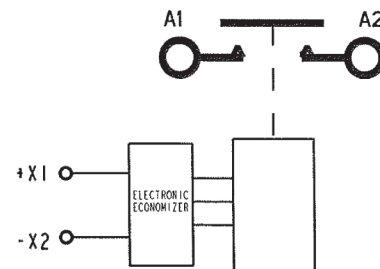
Current, Inrush, Max. @ 30 Vdc —
7.0 Amps

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.

Catalog 5-1773450-5
Revised 3-13

www.te.com

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

Dimensions are in millimeters
unless otherwise specified.

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

For additional support numbers
please visit www.te.com

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 |
| | | 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 |
| 400 | DC | 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 |
| | | 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 |
| 500 | DC | 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 |
| | | 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

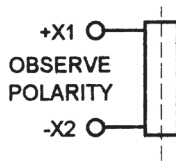
General Characteristics

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

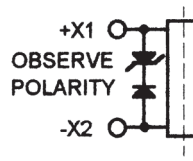
Coil Characteristics

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

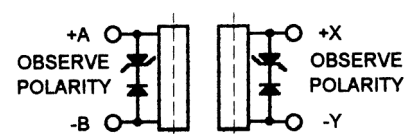
Coil Type



A — Continuous



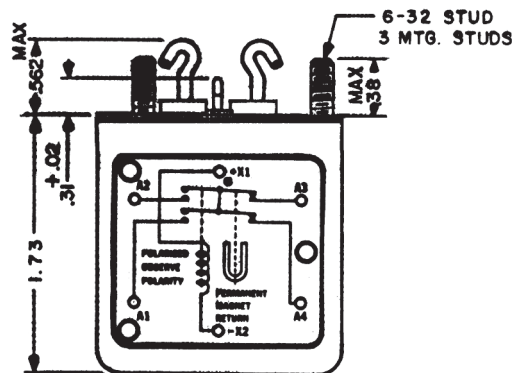
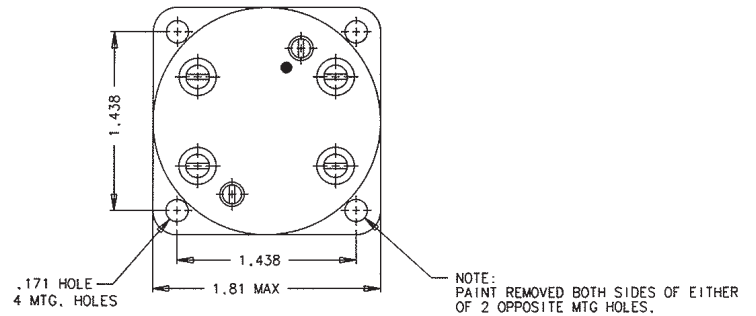
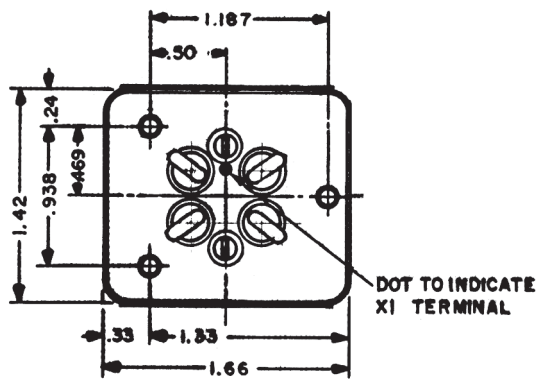
B — Continuous with Suppression



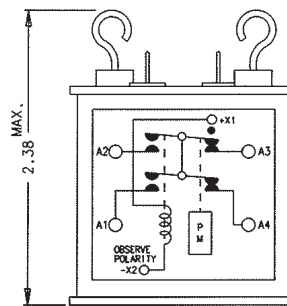
C — Intermittent

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

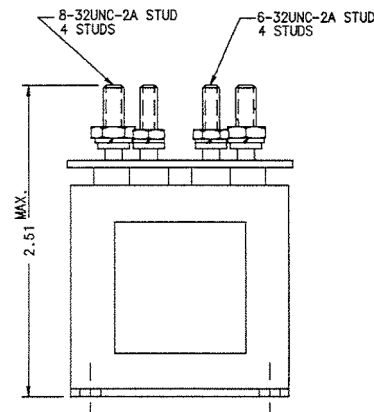
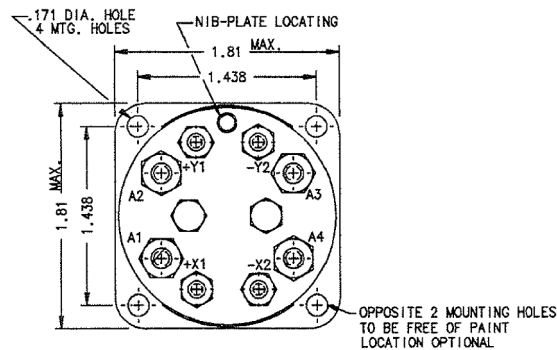
DH-14 and DH-21 Series, Rated up to 25 Amps, 28 Vdc (Continued)



Mounting Style A



Mounting Style B

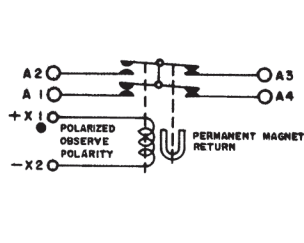


Mounting Style C

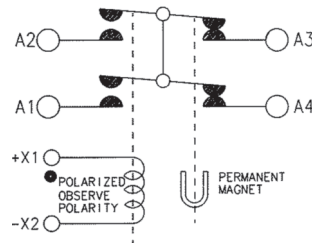
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

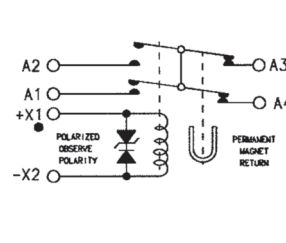
Circuit Configurations (Consult factory for other available circuit configurations)



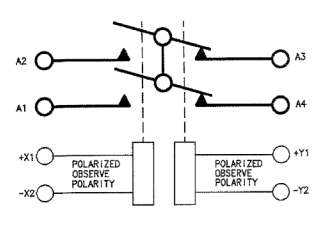
Circuit Configuration 1



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.

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

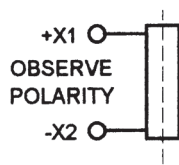
Dropout Voltage @ 25°C, Max. —

1.5 to 7 Vdc

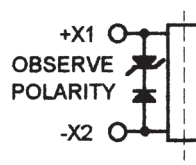
Coil Current @ 25°C, Max. —

0.28 Amp

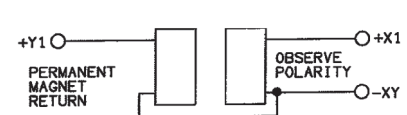
Coil Type



A — Continuous



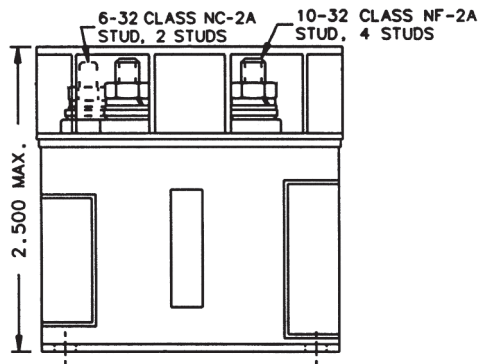
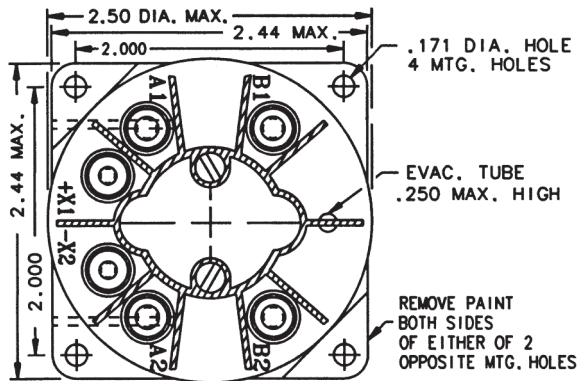
B — Continuous with Suppression



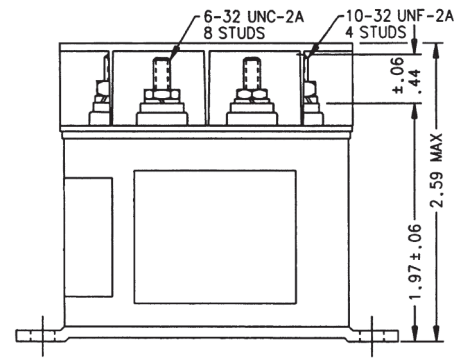
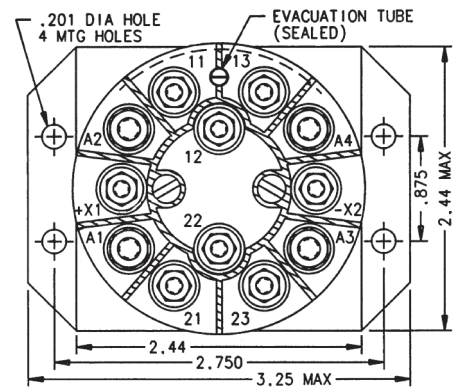
C — Continuous

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

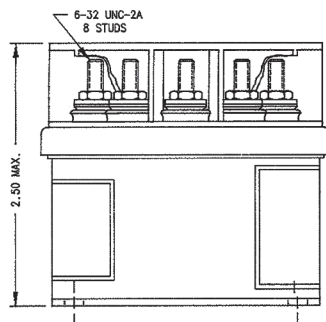
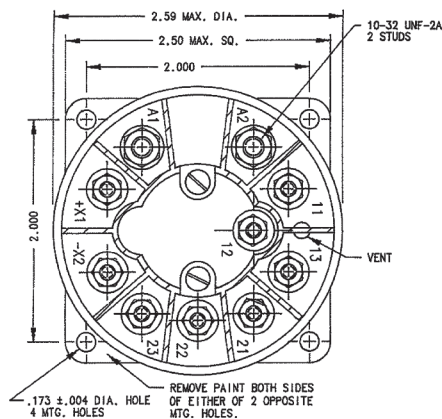
D-7, DH-7 and DH-18 Series, Rated up to 50 Amps, 28 Vdc (Continued)



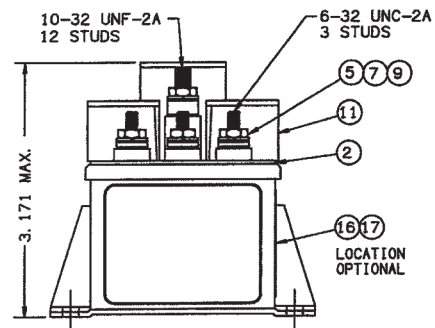
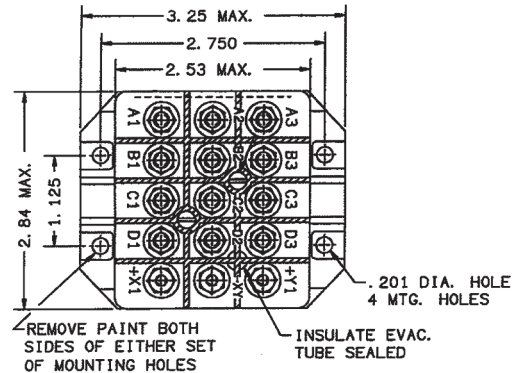
Mounting Style A



Mounting Style B



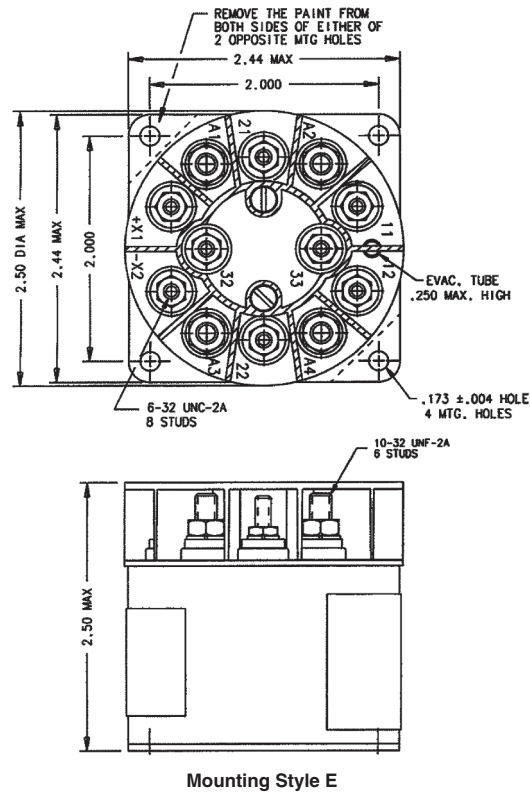
Mounting Style C



Mounting Style D

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

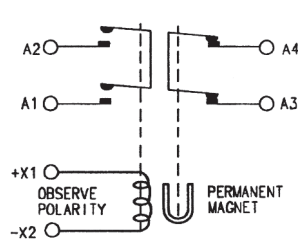
D-7, DH-7 and DH-18 Series, Rated up to 50 Amps, 28 Vdc (Continued)



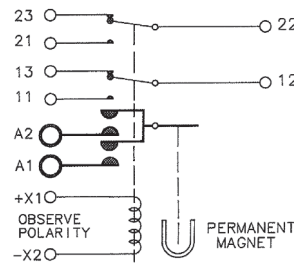
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

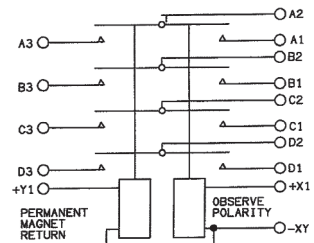
Circuit Configurations (Consult factory for other available circuit configurations)



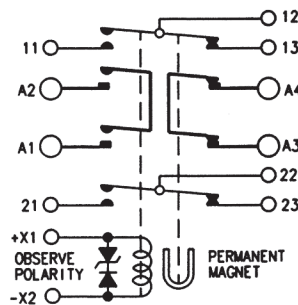
Circuit Configuration 1



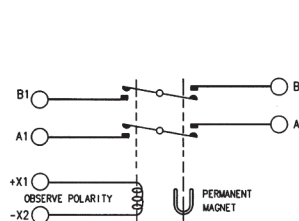
Circuit Configuration 2



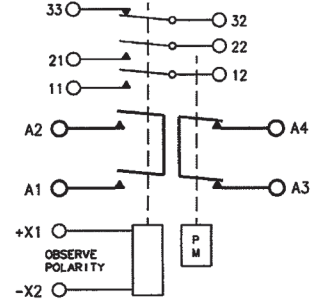
Circuit Configuration 3



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 |

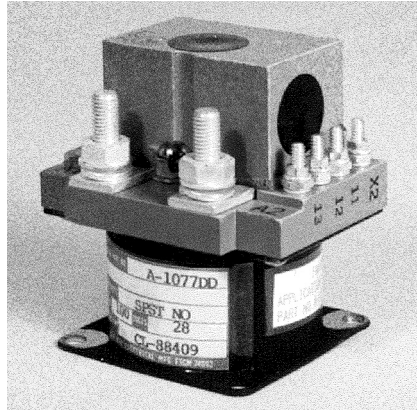
*DH-18DA is a 4PDT center-off unit. Contacts will return to the center position when coil power is removed.

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

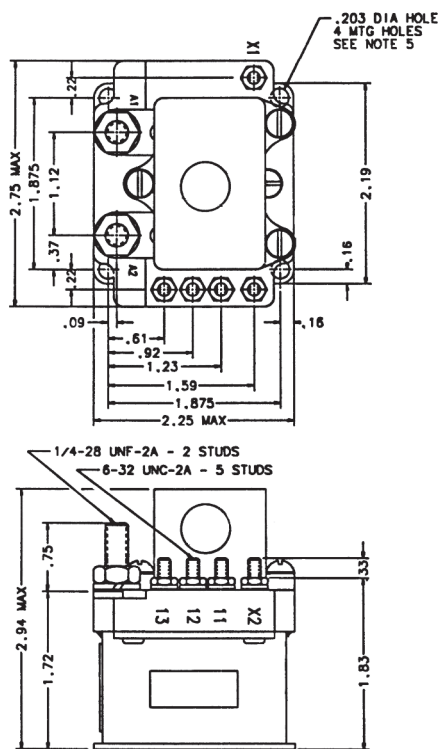
Operating Voltage, Min. — 24 Vdc

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

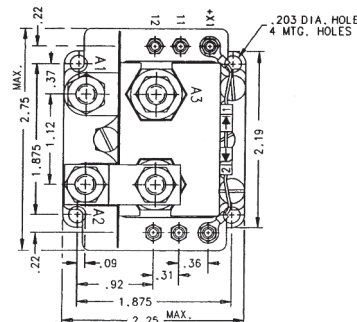
Dropout Voltage — 1 to 7 Vdc

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)

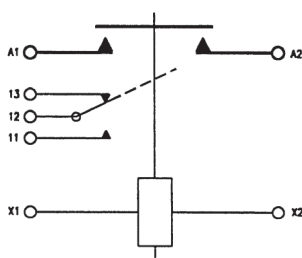


Mounting Style A

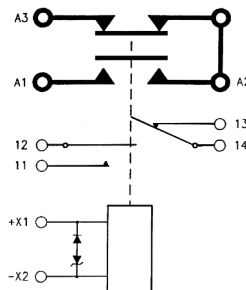


Mounting Style B

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-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 —

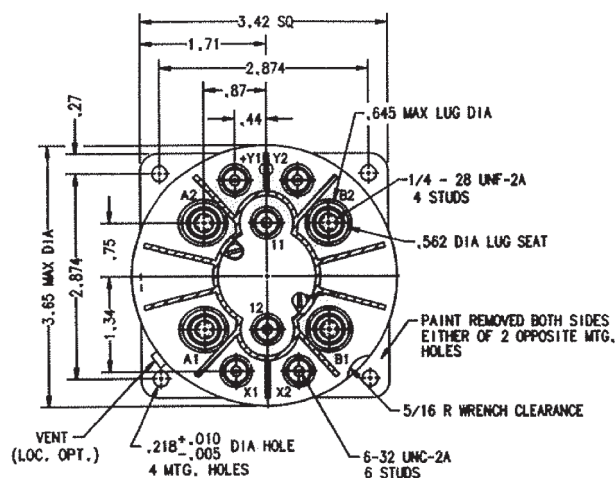
Operating Voltage, Nominal —
28 Vdc

Pickup Voltage @ 25°C, Max., Initial — 15 VDC

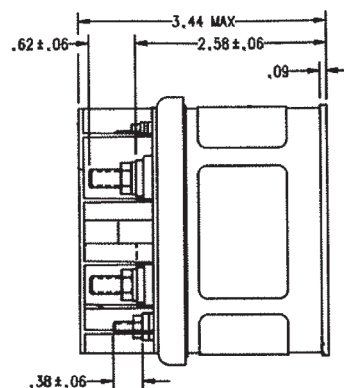
Dropout Voltage @ 25°C —
2.0 V to 6.5 V

Coil Resistance ±20% @ 25°C —
163 Ohms

Coil Current @ 25°C —
.215 Amp Max. @ 28 Vdc

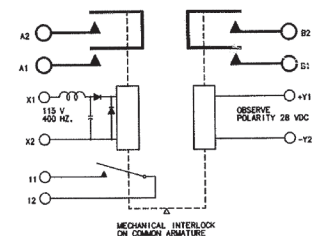


Mounting Style A



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

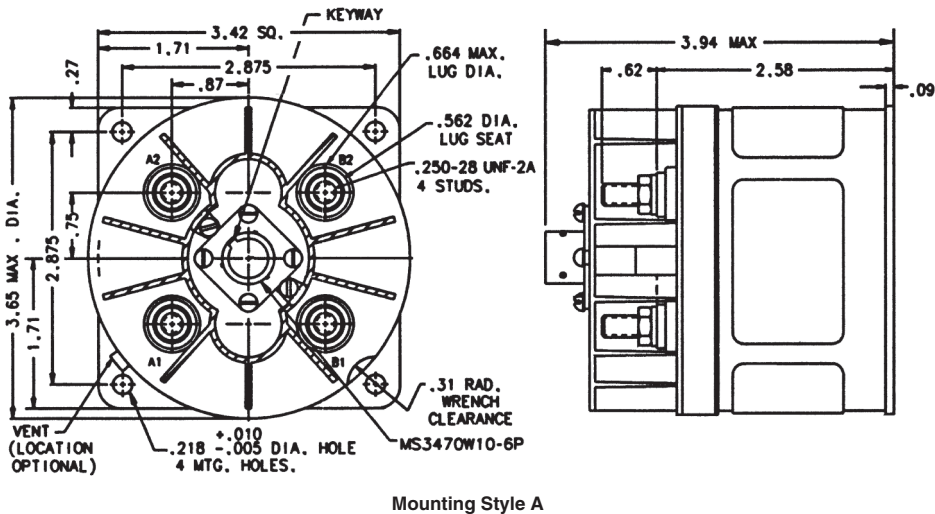
- Main Contacts —**
- Main Contact Configuration —** 2PST, Center Off
- Voltage, Nom. —** 28 Vdc
- Resistive Rating —** 100 Amps
- Inductive Rating —** 100 Amps
- Motor Rating —** 80 Amps
- Lamp Rating —** 50 Amps
- Overload Rating —** 800 Amps
- Rupture Rating —** 1,000 Amps
- Auxiliary Contacts —**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



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 —

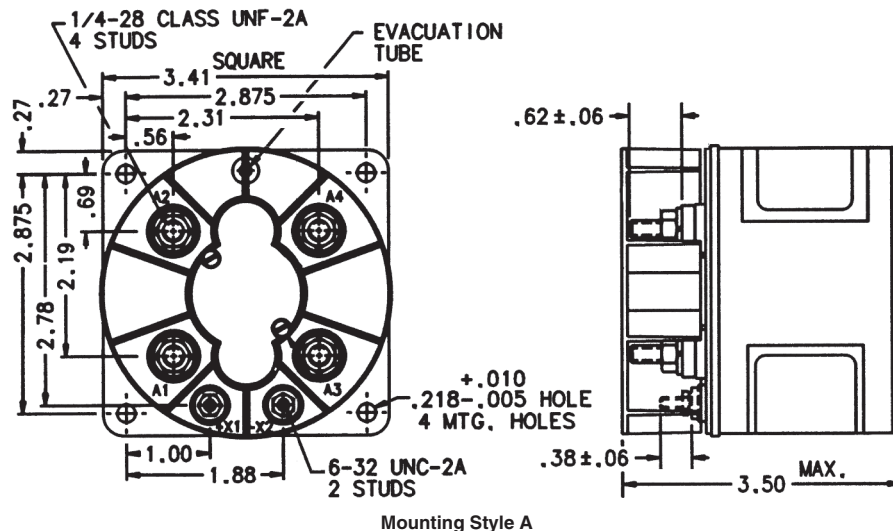
Continuous

Operating Voltage, Max. — 32 Vdc

Operating Voltage @ 21°C, Min. — 18 Vdc

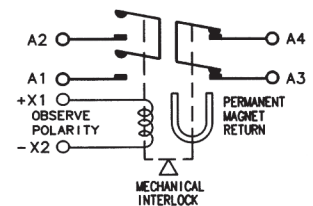
Dropout Voltage @ 25°C, Max. — 1.0 to 7 Vdc

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

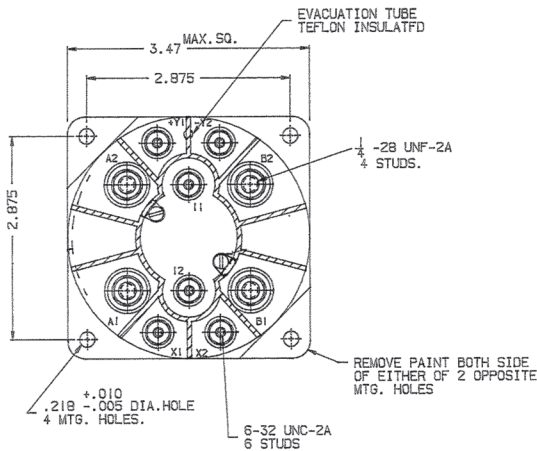
- Resistive Rating —** 5 Amp
- Inductive Rating —** 5 Amp

General Characteristics

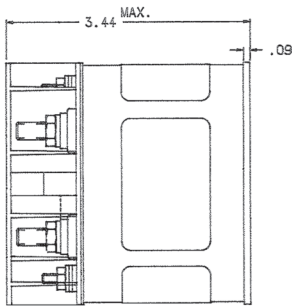
- Temperature Range —**
-55°C to +120°C
- Operating Cycles (Life) at Rated Resistive Load, Min. —** 50,000 cycles
- Weight —** 1 lb 13 oz

Coil Characteristics

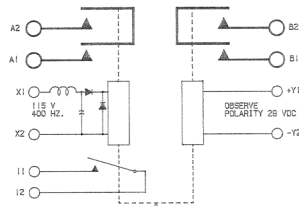
- Duty Cycle —** Continuous
- Operating Voltage, Nom. —**
Coil X1-X2 (120 V, 400 Hz) —
Pickup 100 V Max. Hot
Dropout 25 V ± 20 V
Nom. Resistance 1050 Ohms ± 10%
- Coil Y1-Y2 (28 Vdc) —
Pickup 20 Vdc Max. Hot
Dropout 1.5 to 7 Vdc
Nom. Resistance 163 Ohms ± 10%
- Coil Current @ Nom. 120 V —**
X1-X2 — 0.12 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

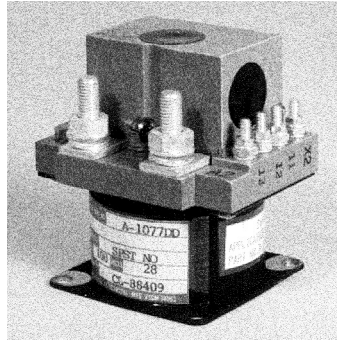
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

| 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

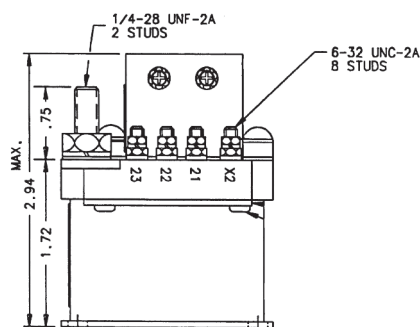
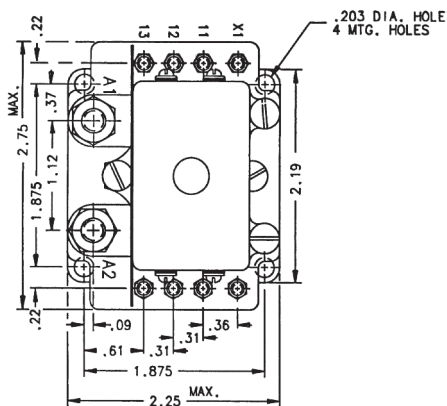
Duty Cycle — Continuous

Operating Voltage, Max. — 32 Vdc

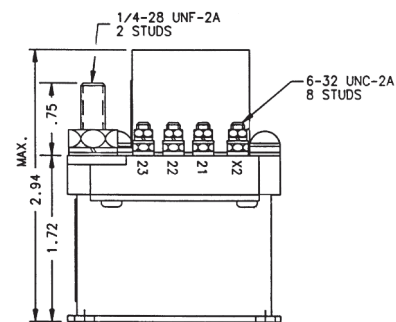
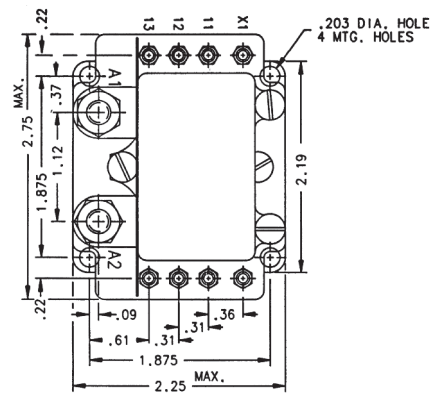
Operating Voltage, Nom. — 24 Vdc

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

Dropout Voltage — 1.0 to 7 Vdc



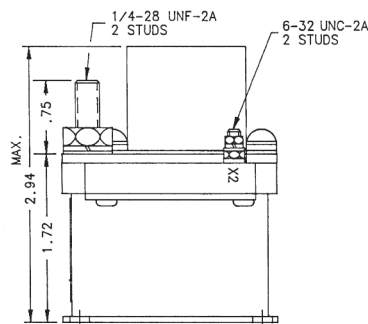
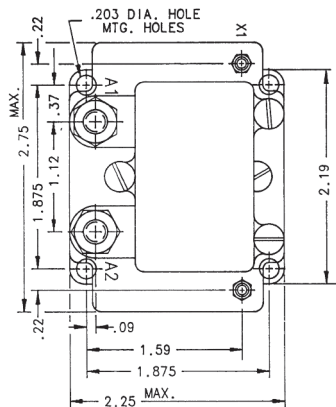
Mounting Style A



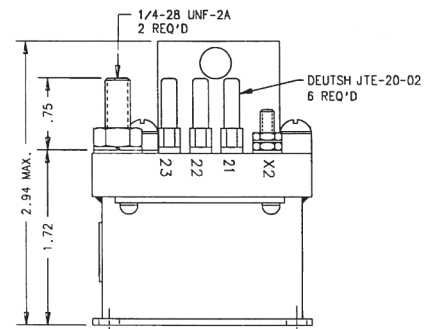
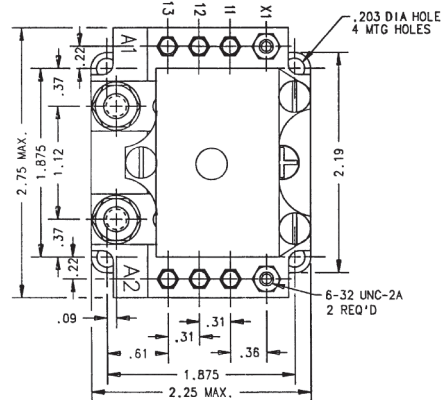
Mounting Style B

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

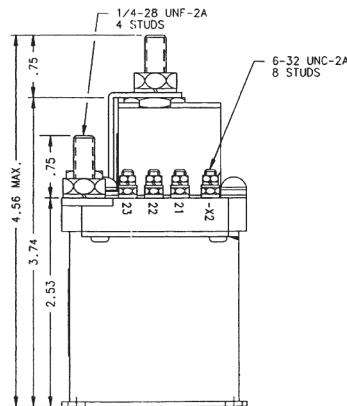
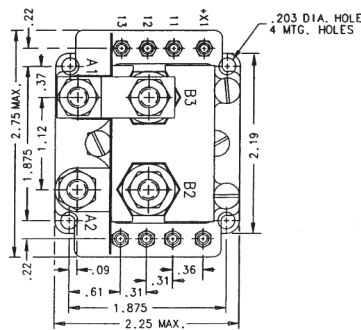
A1077 Series, Rated up to 200 Amps, 28 Vdc (Continued)



Mounting Style C



Mounting Style D

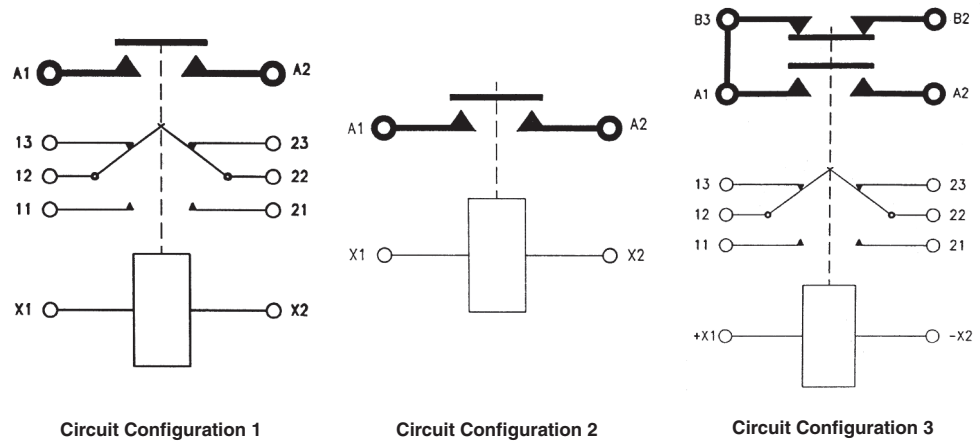


Mounting Style E

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)



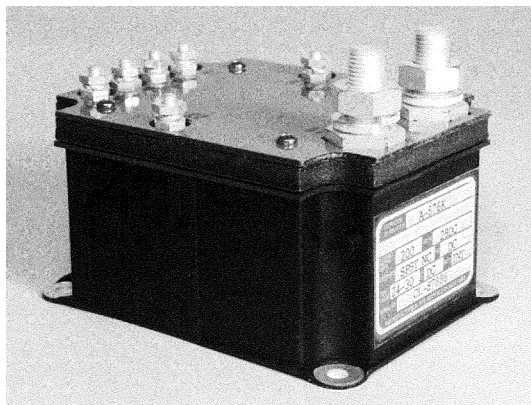
| HARTMAN Part Number | Construction Type | Mounting Style | Coil Type | Circuit Config. | TE Part Number |
|---------------------|-------------------|----------------|--------------|-----------------|----------------|
| A-1077D | Gasket Sealed | A | Intermittent | 1 | 1616055-2 |
| A-1077F | Gasket 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

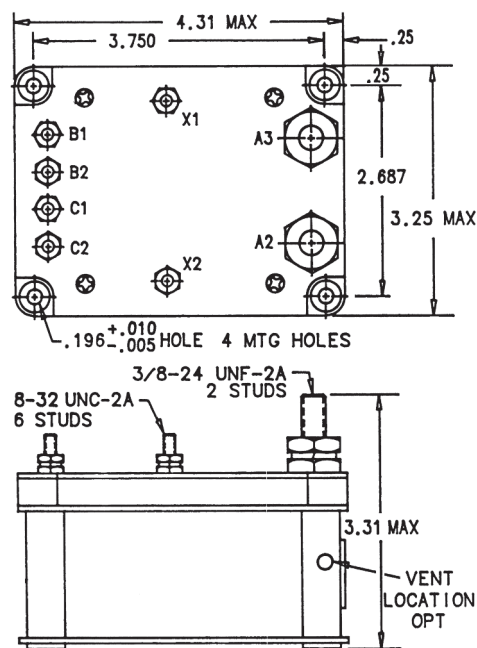
Duty Cycle — Intermittent

Operating Voltage — 24 to 30 Vdc

Pickup Voltage, Max. — 18 Vdc

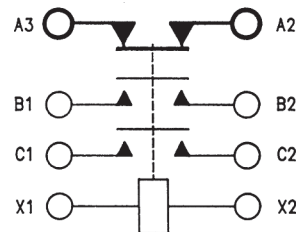
Dropout Voltage — 1 to 7 Vdc

Coil Resistance $\pm 20\%$ @ 25°C —
19.7 Ohms



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

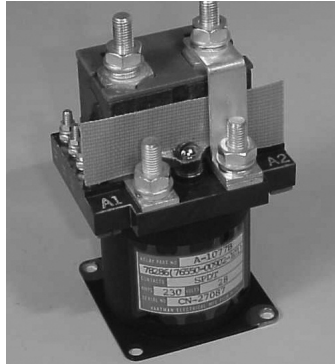
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

| 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

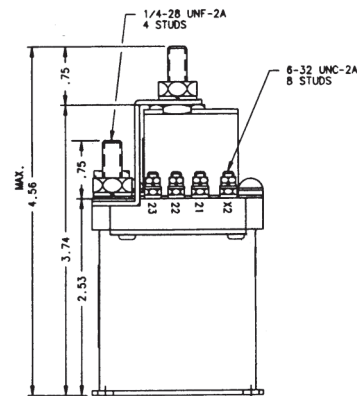
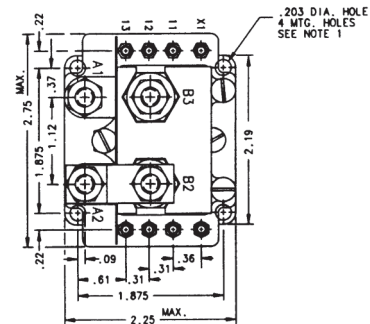
Duty Cycle — Continuous

Operating Voltage, Max. —
30 Vdc

Operating Voltage, Nom. —
24 Vdc

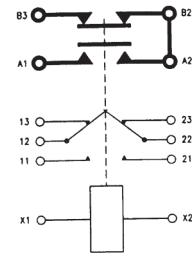
Pickup Voltage @ 25°C, Max. —
16.5 Vdc

Dropout Voltage — 0.5 to 7 Vdc



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

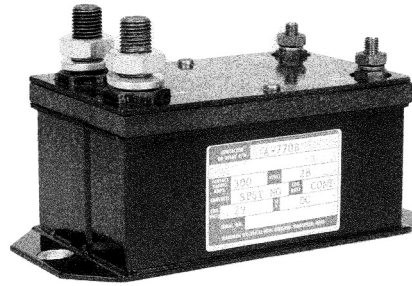
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

| 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

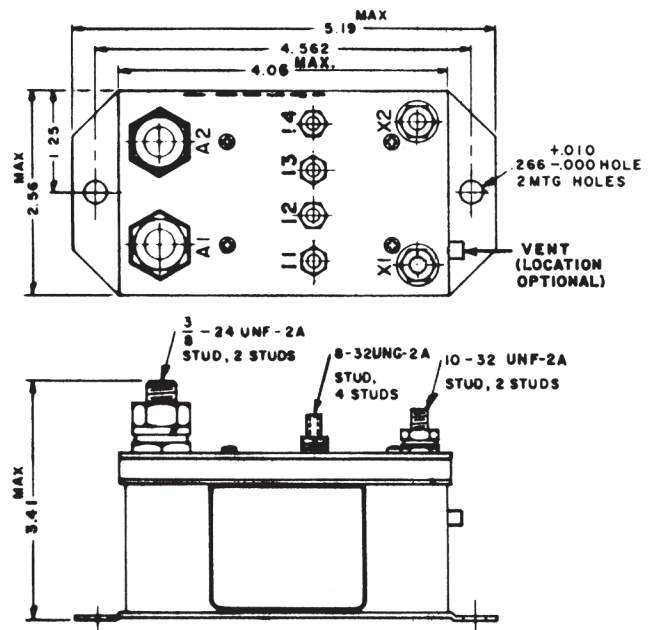
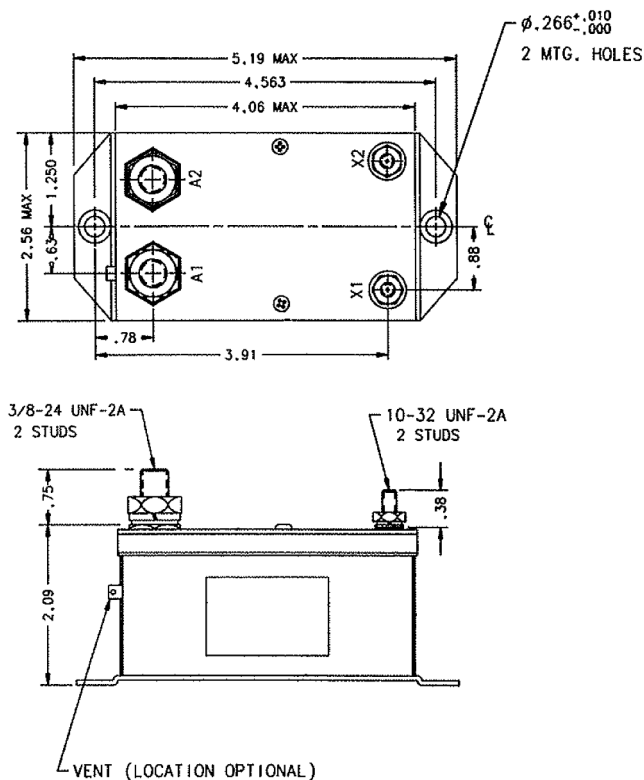
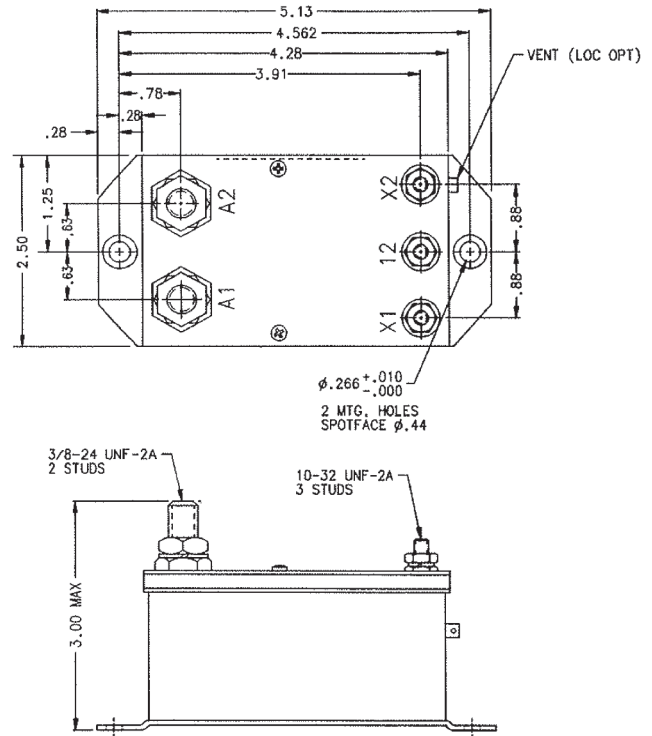
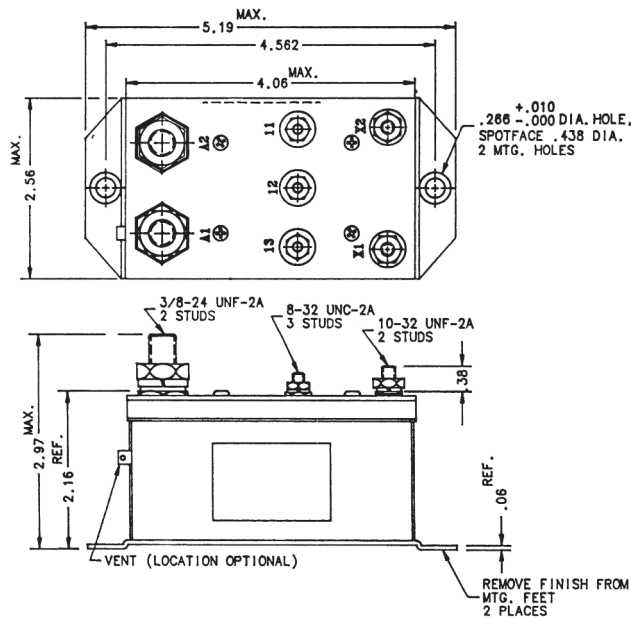
Dropout Voltage @ 25°C —
1.5 to 5 Vdc

Coil Current, Max., Holding —

Coil Type A — 0.4 Amp

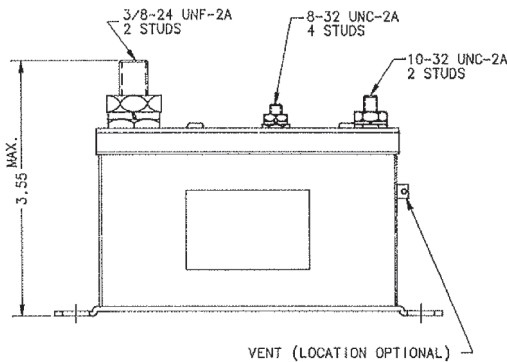
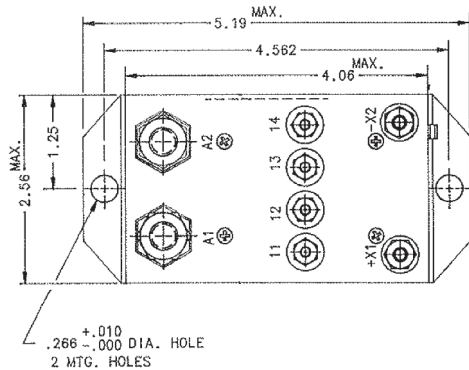
Coil Type B — 0.625 Amp

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

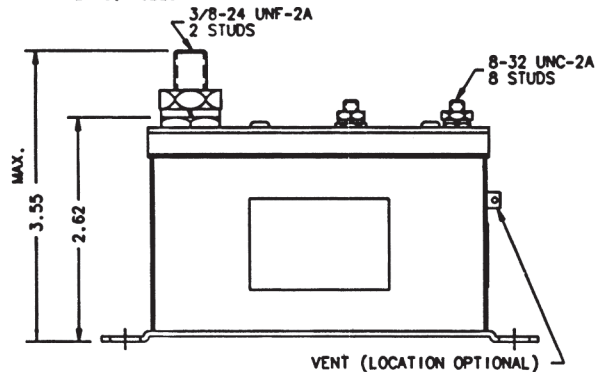
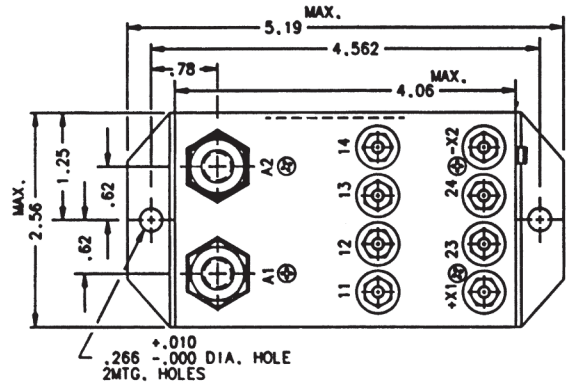


For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

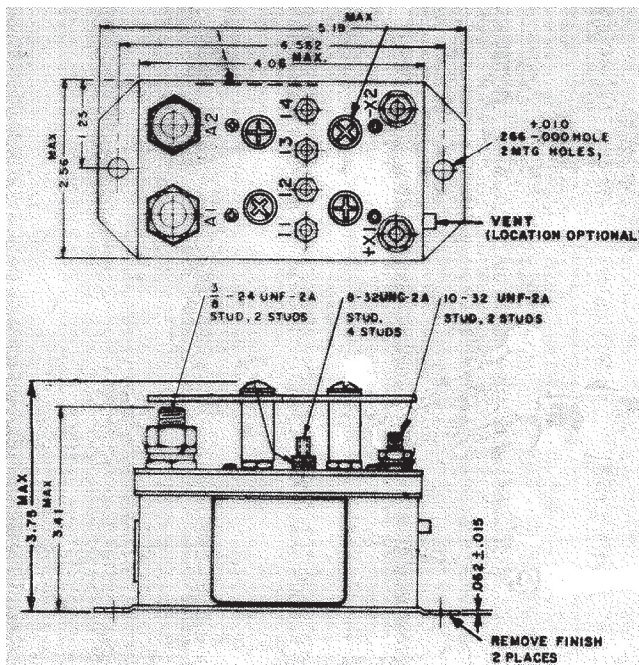
A-770 and AR-770 Series, Rated up to 300 Amps, 28 Vdc (Continued)



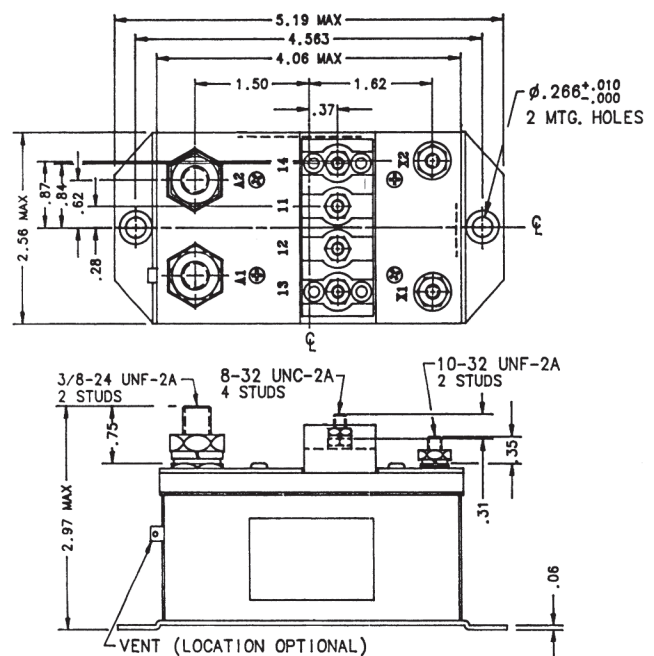
Mounting Style E



Mounting Style F



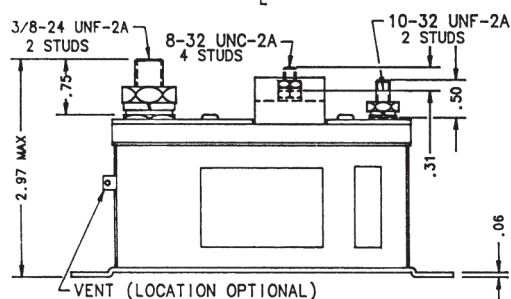
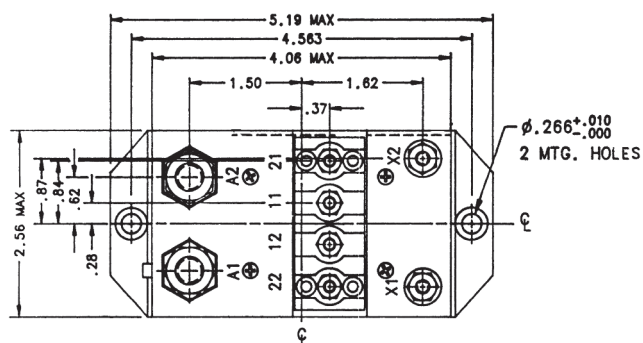
Mounting Style G



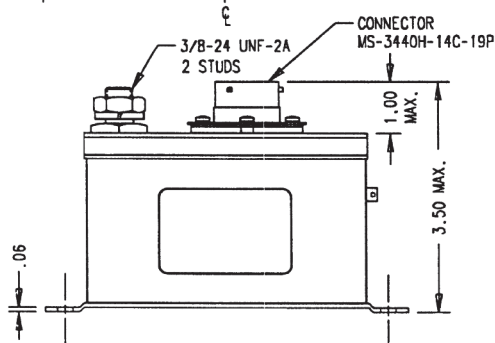
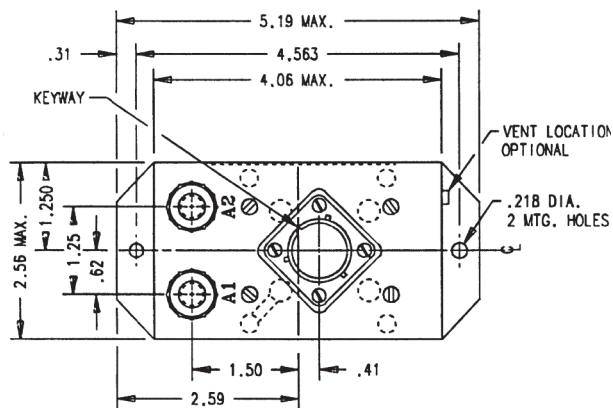
Mounting Style H

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

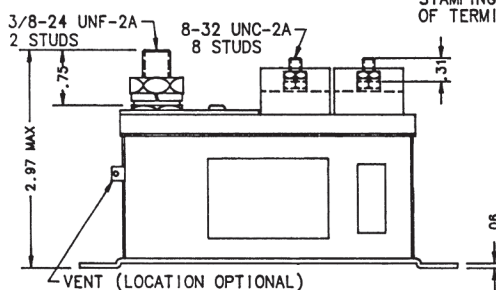
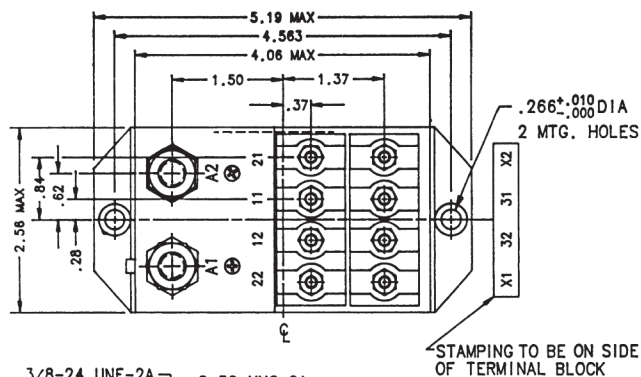
A-770 and AR-770 Series, Rated up to 300 Amps, 28 Vdc (Continued)



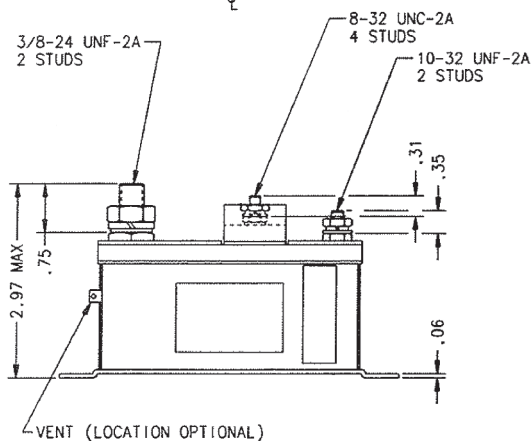
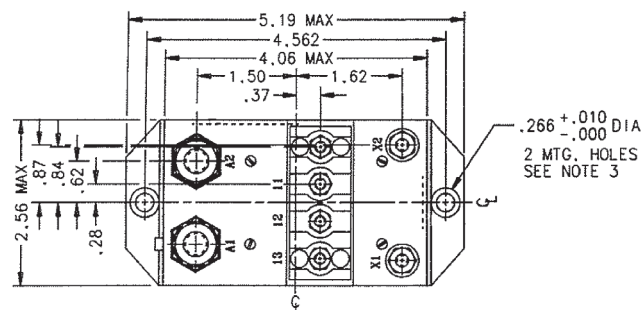
Mounting Style I



Mounting Style K



Mounting Style J

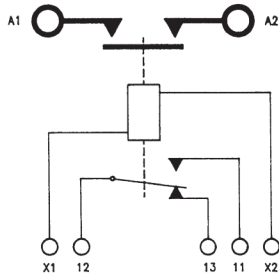


Mounting Style L

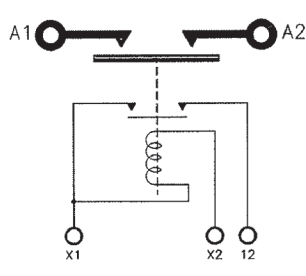
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

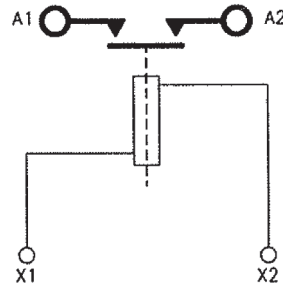
Circuit Configurations (Consult factory for other available circuit configurations)



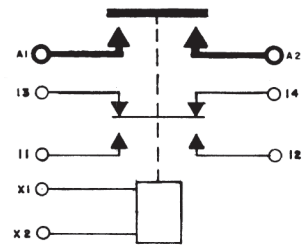
Circuit Configuration 1



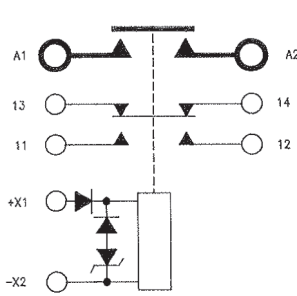
Circuit Configuration 2



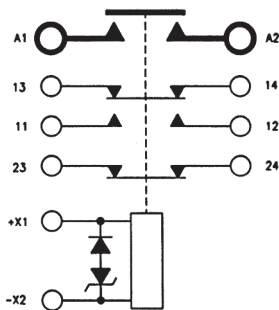
Circuit Configuration 3



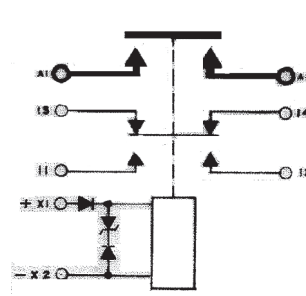
Circuit Configuration 4



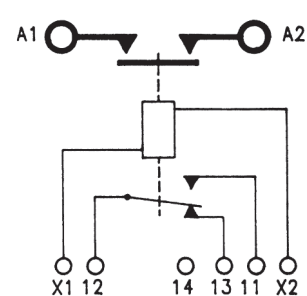
Circuit Configuration 5



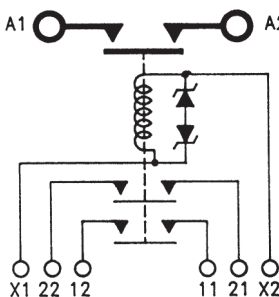
Circuit Configuration 6



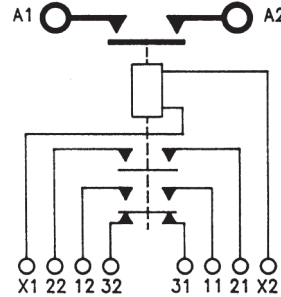
Circuit Configuration 7



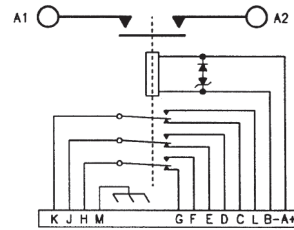
Circuit Configuration 8



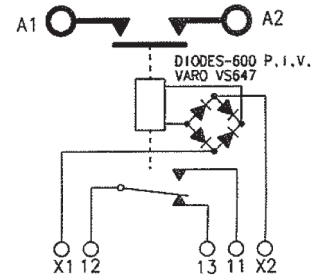
Circuit Configuration 9



Circuit Configuration 10



Circuit Configuration 11



Circuit Configuration 12

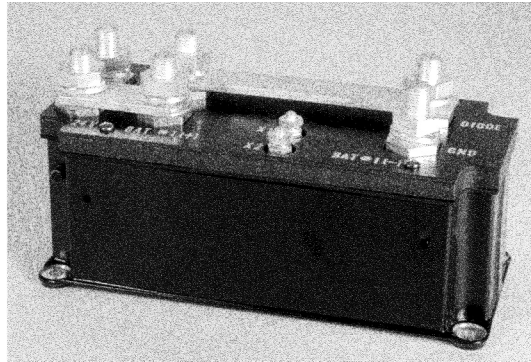
| HARTMAN Part Number | Construction Type | Mounting Style | Coil Type | Circuit Config. | TE Part Number |
|---------------------|-------------------|----------------|----------------------|-----------------|----------------|
| A-770AM | Gasket/Vented | A | Continuous | 1 | 3-1616058-1 |
| A-770N | 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

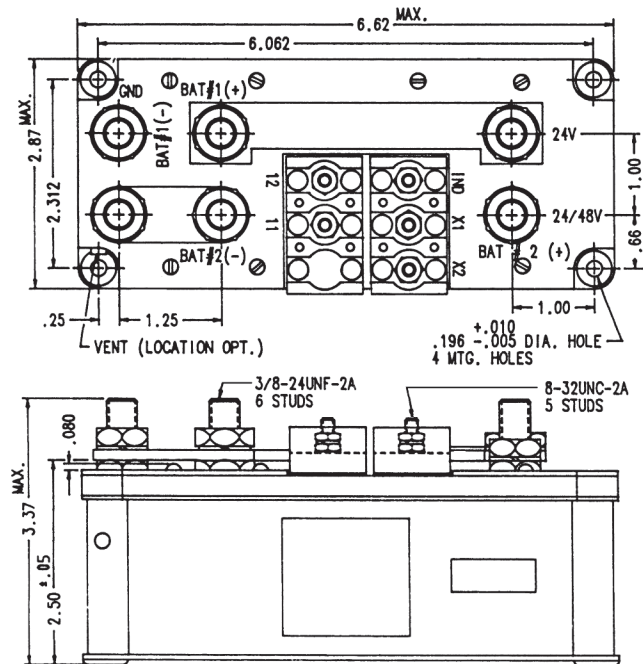
Duty Cycle — Intermittent

Operating Voltage, Max. — 31 Vdc

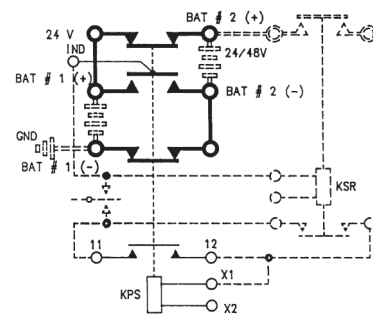
Operating Voltage, Min. — 18 Vdc

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

Dropout Voltage — 1.5 to 7 Vdc



Circuit Configurations (Consult factory for other available circuit configurations)



| 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 |

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

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)

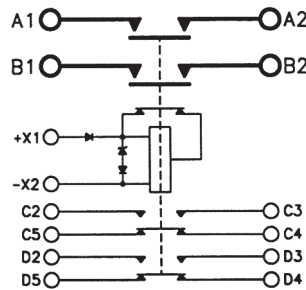
Coil Current, Inrush, Max. —

3.0 Amp

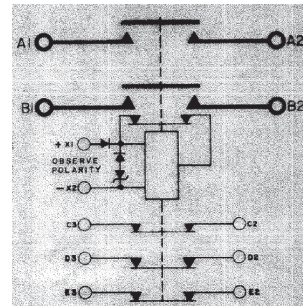
Coil Current, Holding, Max. —

0.35 Amp

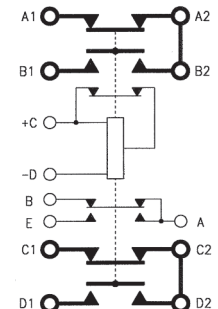
Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 2

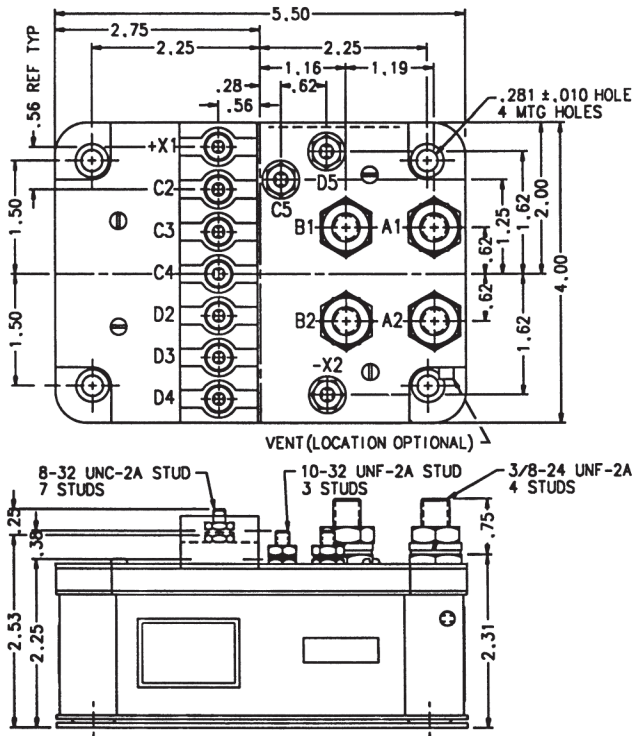


Circuit Configuration 3

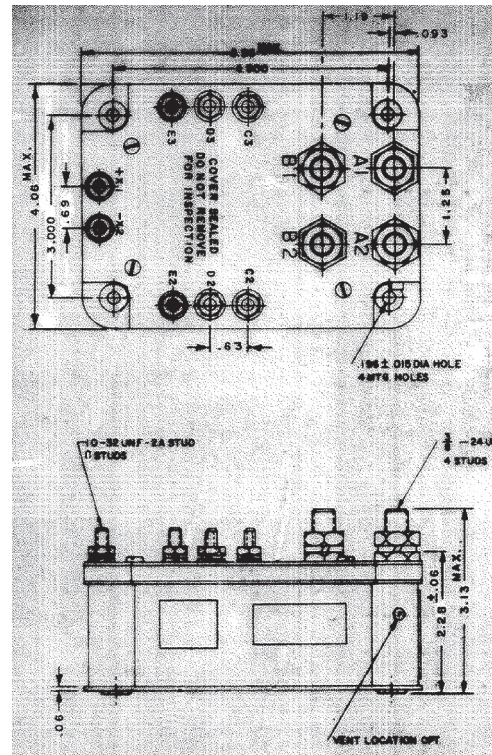
| HARTMAN Part Number | Construction Type | Mounting Style | Coil Type | Circuit Config. | TE Part Number |
|---------------------|-------------------|----------------|---------------------------------|-----------------|----------------|
| A-848MAS | Gasket/Vented | A | Continuous w/Supp., Economizing | 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.

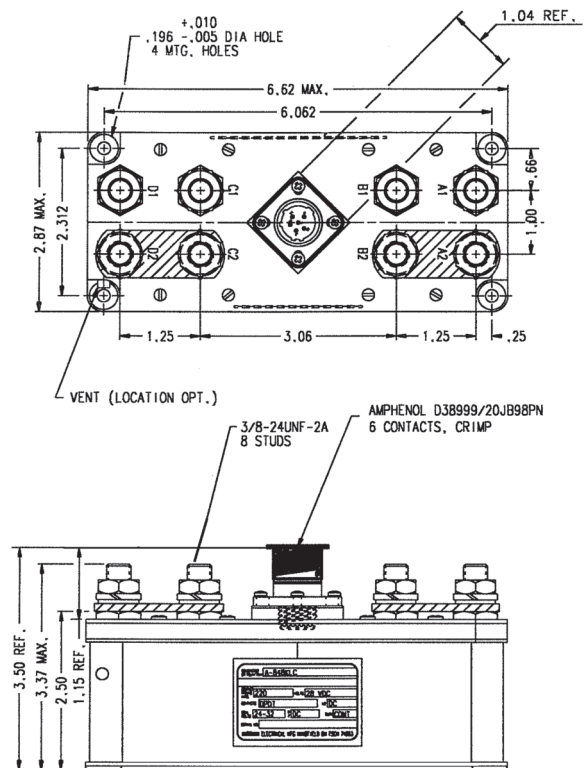
A-48 Series, Rated up to 300 Amps, 28 Vdc (Continued)



Mounting Style A



Mounting Style B



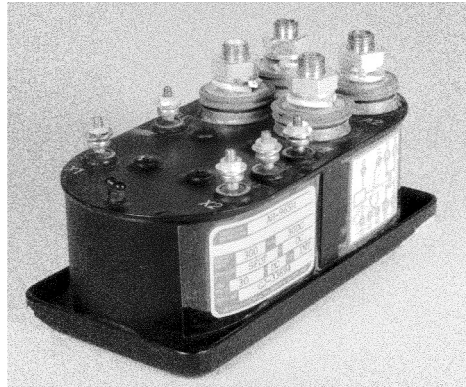
Mounting Style C

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

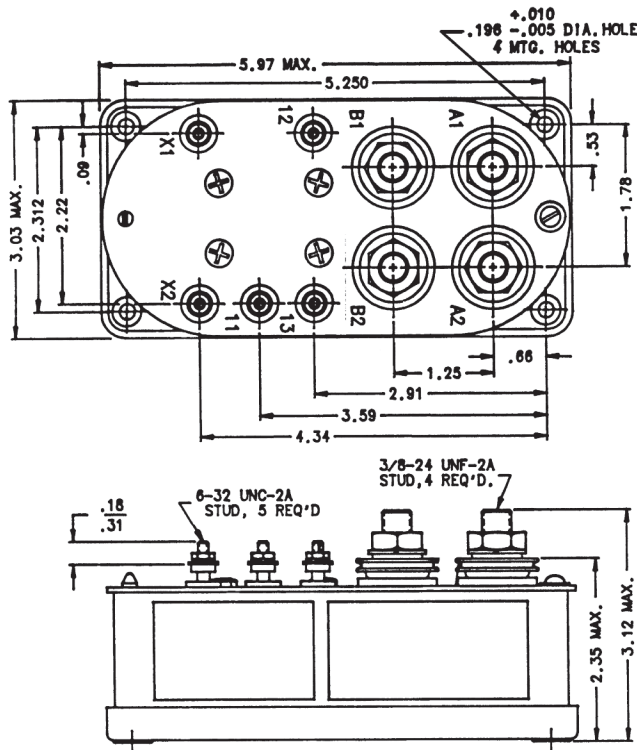
Duty Cycle — Intermittent, 3 minutes max.

Operating Voltage, Max. — 30 Vdc

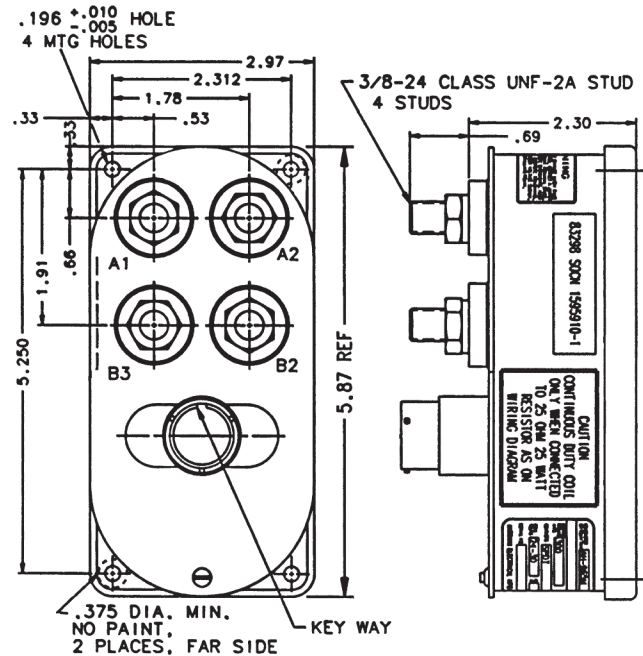
Pickup Voltage, Max. Hot — 20 Vdc

Dropout Voltage — 0.5 to 5 Vdc

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

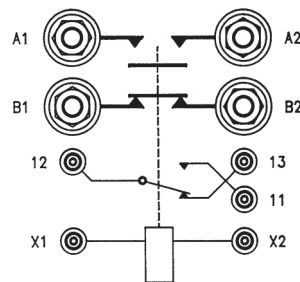


Mounting Style A

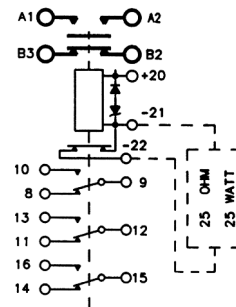


Mounting Style B

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

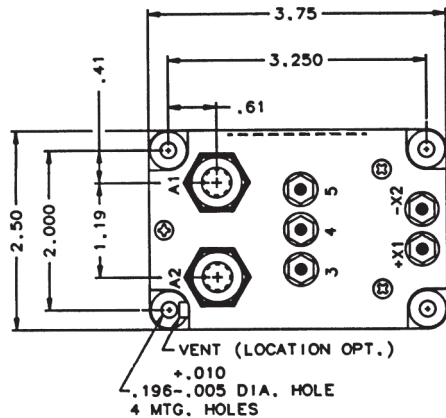
A-400B, A-400D, A400DB-1 —
1 to 7 Vdc

A-400DC, A-400G, A-400G-2 —
1.0 Vdc Min.

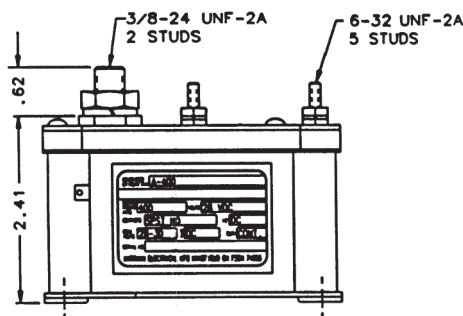
A-400S — +X to -X2 — 1 to 7 Vdc

+Y1 to -Y2 — 0.5 to 5 Vdc

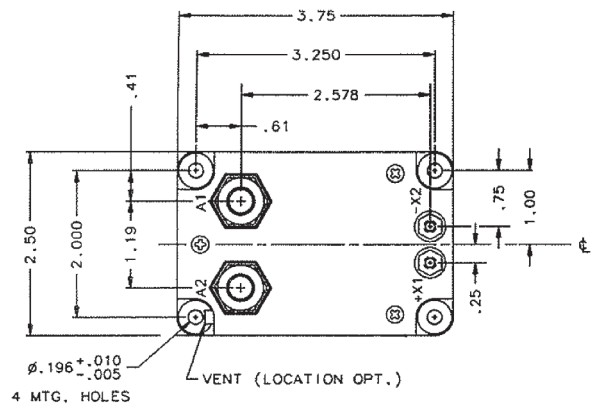
A-400 Series, Rated up to 400 Amps, 28 Vdc (Continued)



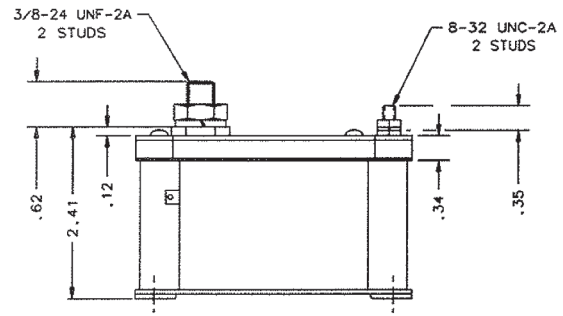
VENT (LOCATION OPT.)
 $\phi .196^{+.010}_{-.005}$ DIA. HOLE
 4 MTG. HOLES



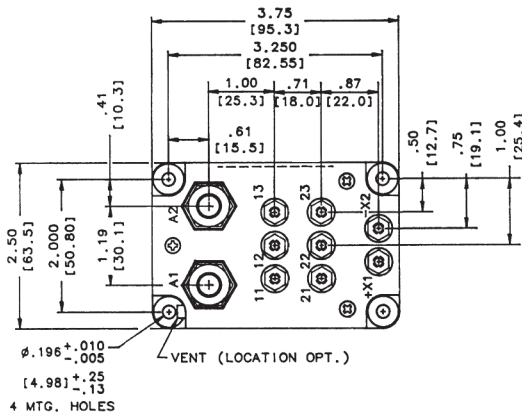
Mounting Style A



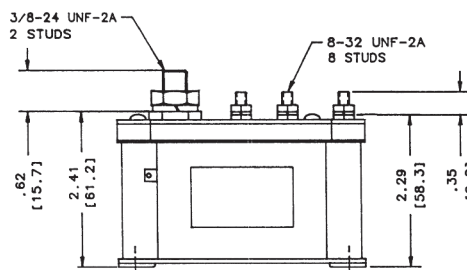
VENT (LOCATION OPT.)
 4 MTG. HOLES



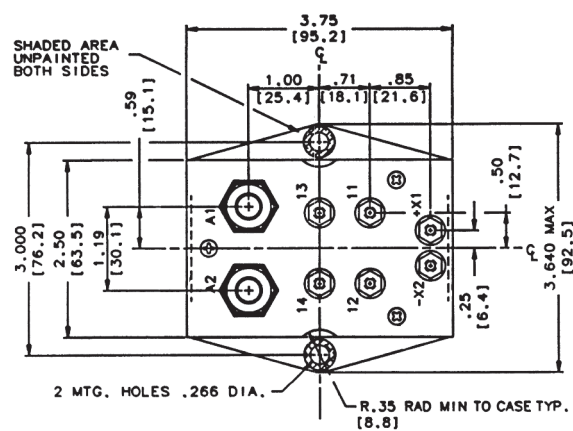
Mounting Style B



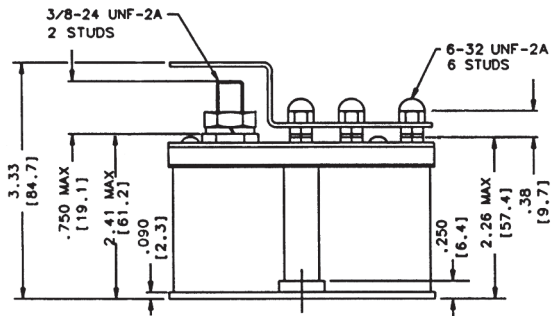
VENT (LOCATION OPT.)
 $\phi .196^{+.010}_{-.005}$ DIA. HOLE
 4 MTG. HOLES



Mounting Style C



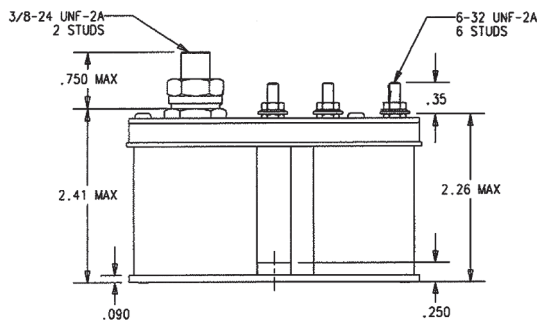
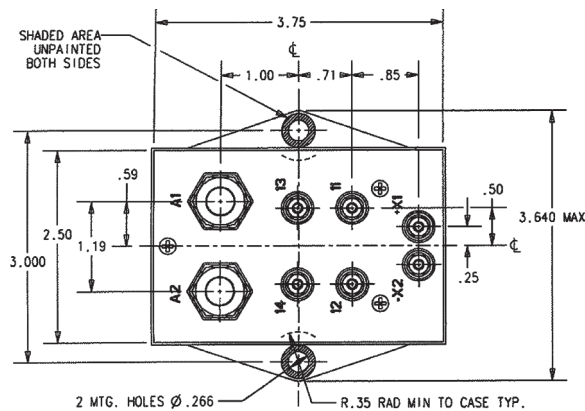
2 MTG. HOLES .266 DIA.
 R.35 RAD MIN TO CASE TYP. (8.8)



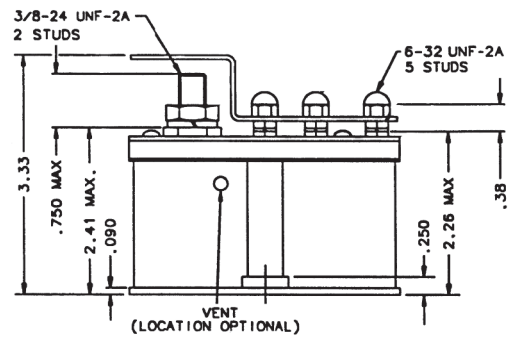
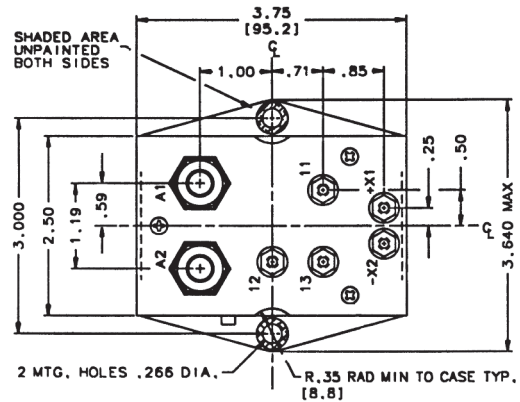
Mounting Style D

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

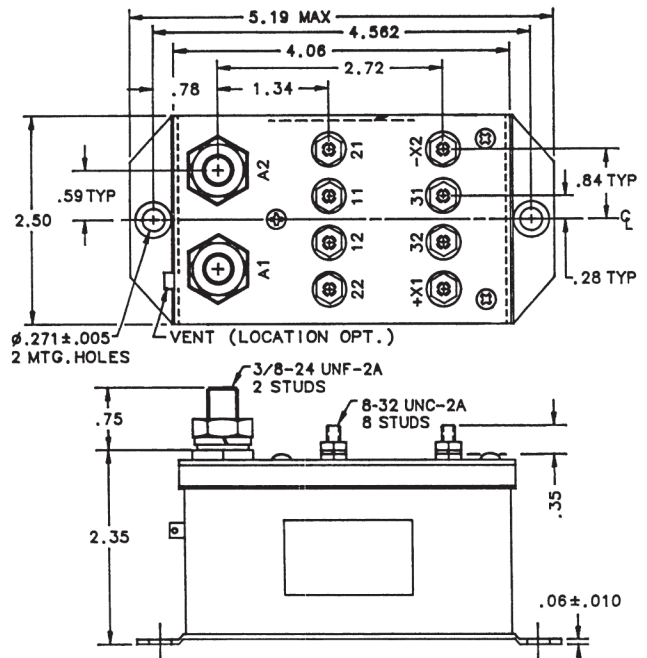
A-400 Series, Rated up to 400 Amps, 28 Vdc (Continued)



Mounting Style E



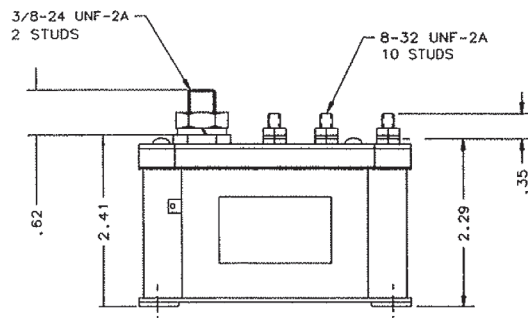
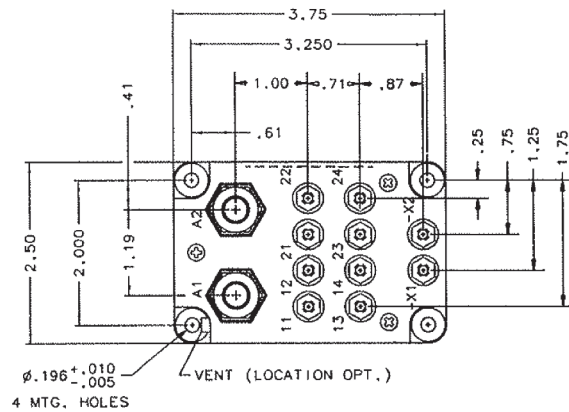
Mounting Style F



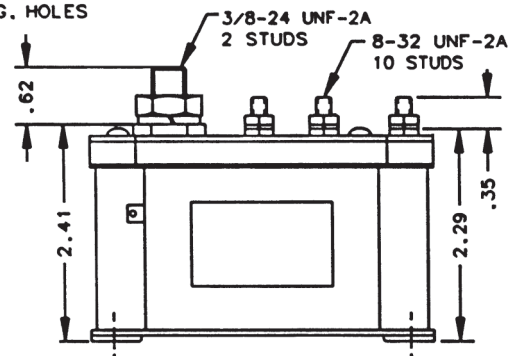
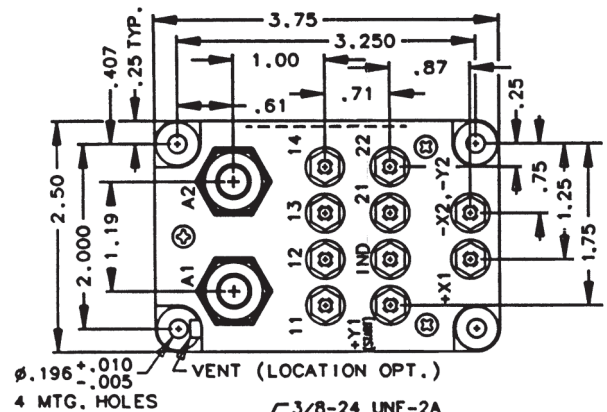
Mounting Style G

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

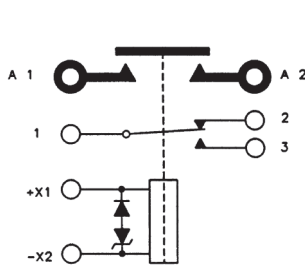


Mounting Style J

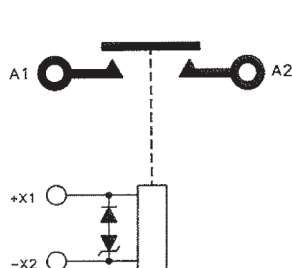
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

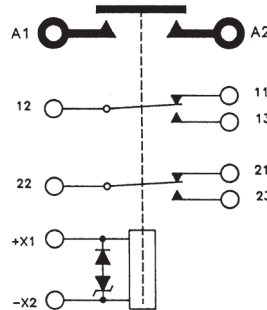
Circuit Configurations (Consult factory for other available circuit configurations)



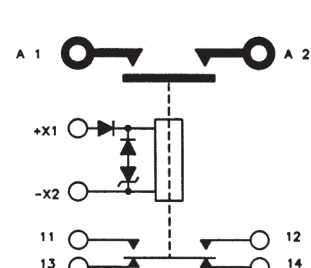
Circuit Configuration 1



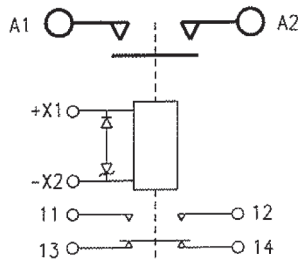
Circuit Configuration 2



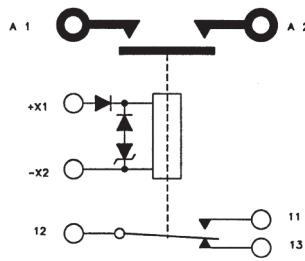
Circuit Configuration 3



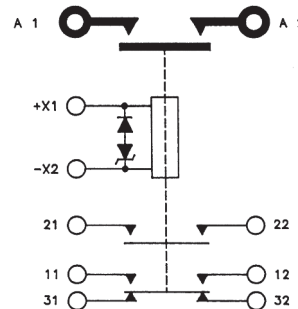
Circuit Configuration 4



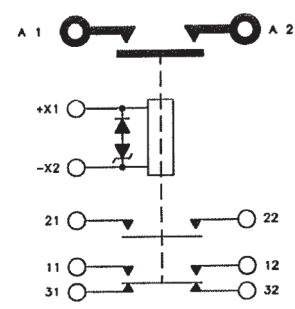
Circuit Configuration 5



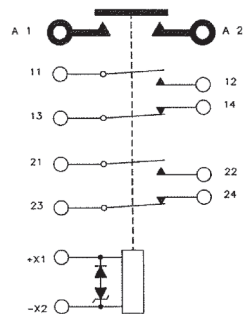
Circuit Configuration 6



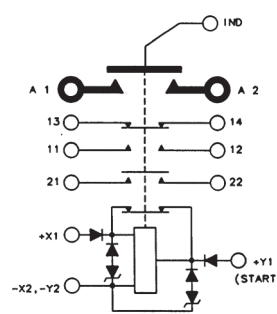
Circuit Configuration 7



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

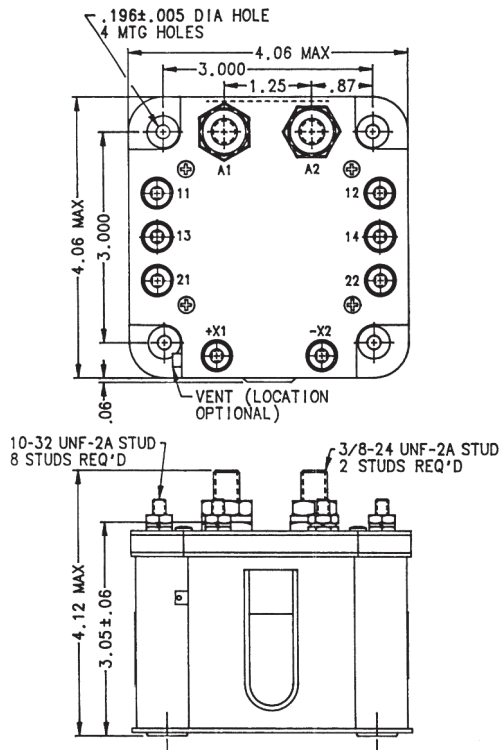
Pickup Voltage @ 25°C, Max. —
A-703B — 8 Vdc
A-703DBH — 10 Vdc
A-703, A-703CD, A-703CSM, A-703D,
A-703FA, A-703FB, A-703FSS,
A-703ZS — 12 Vdc
A-703T — 13 Vdc
AH-703F, A-703E, A-703G-1, A-703GC,
A-703GS, A-703R, AH-703F — 16 Vdc

Dropout Voltage

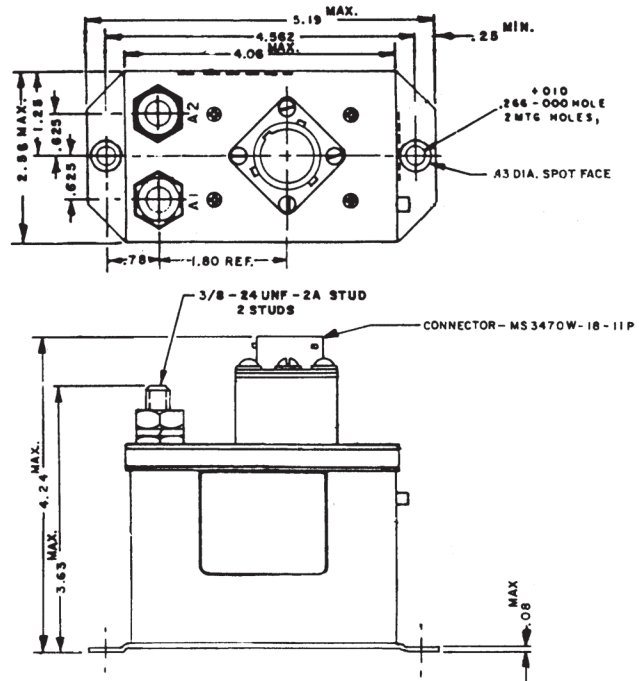
A-703B — 0.5 to 3 Vdc
A-703CD, A-703FA, A-703FB —
0.5 to 5 Vdc
A-703T — 0.5 to 6 Vdc
A-703, A-703CSM, A-703D, A-703FSS,
A-703ZS — 0.5 to 7 Vdc
A-703DBH, A-703E, A-703R —
1.0 to 7 Vdc
AH-703F, A-703G-1, A-703GC, A-
703GS, AH-703F — 1.5 to 7 Vdc

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

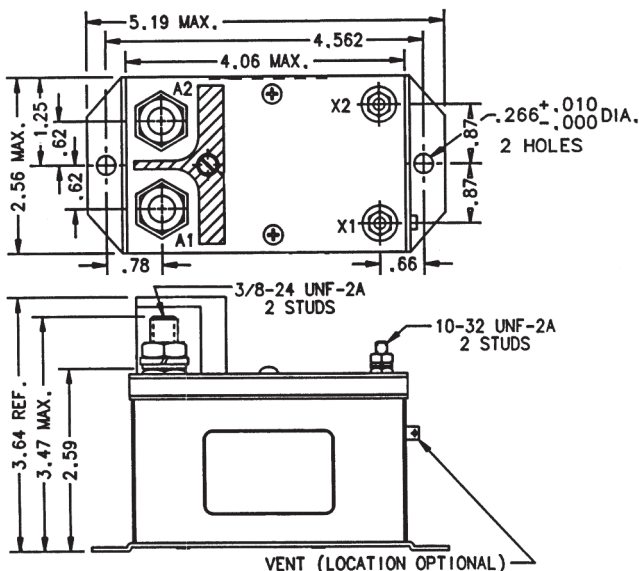
A-703 and AH-703 Series, Rated up to 400 Amps, 28 Vdc (Continued)



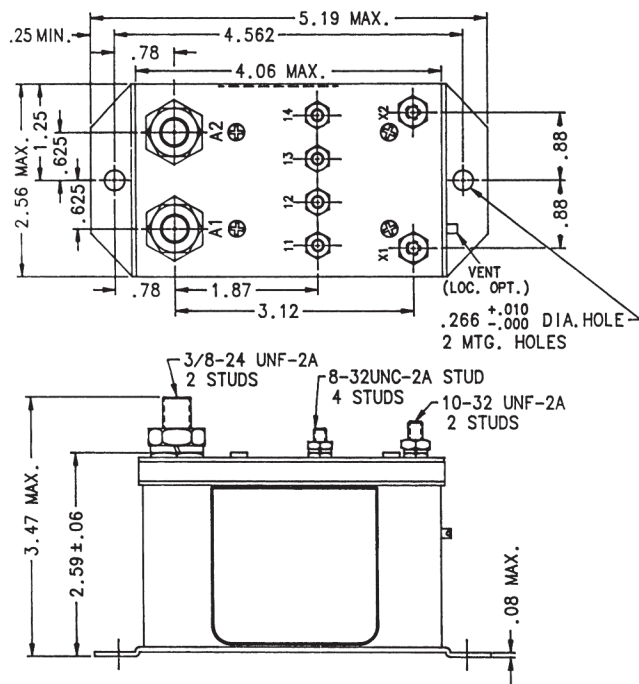
Mounting Style A



Mounting Style B



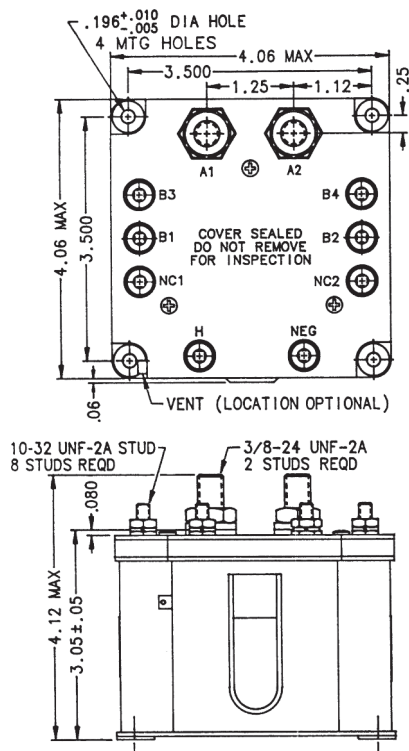
Mounting Style C



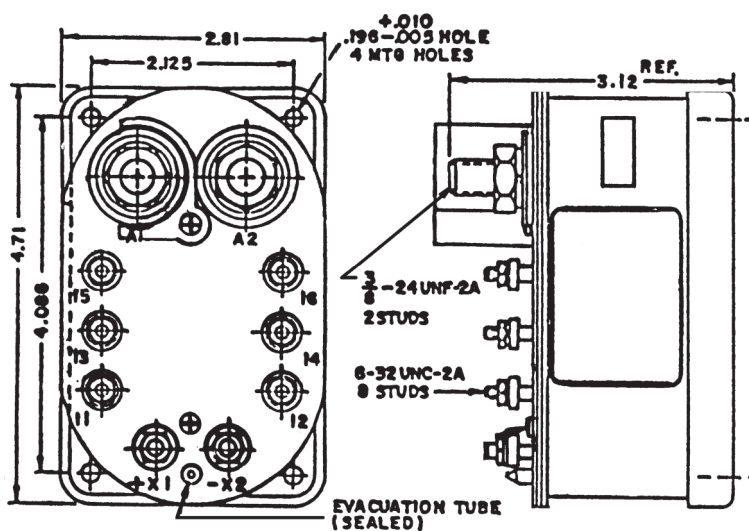
Mounting Style D

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

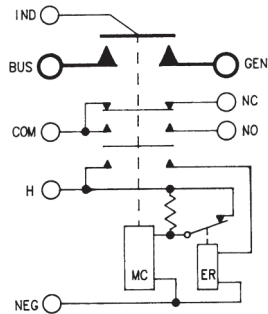


Mounting Style F

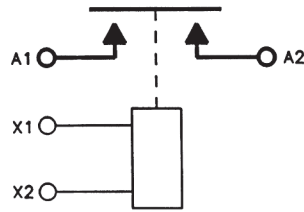
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

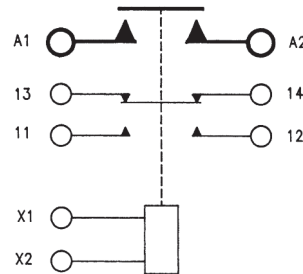
Circuit Configurations (Consult factory for other available circuit configurations)



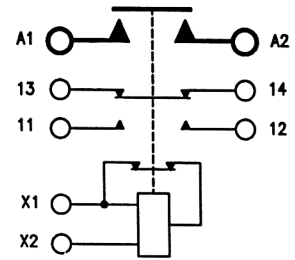
Circuit Configuration 1



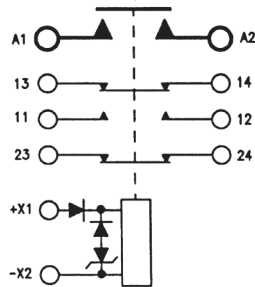
Circuit Configuration 2



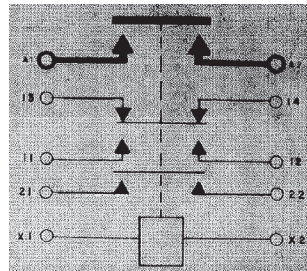
Circuit Configuration 3



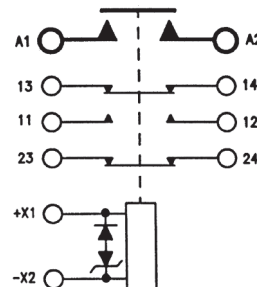
Circuit Configuration 4



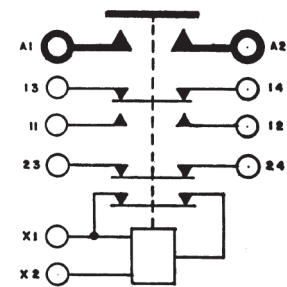
Circuit Configuration 5



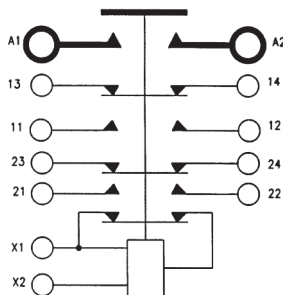
Circuit Configuration 6



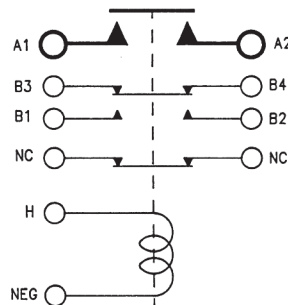
Circuit Configuration 7



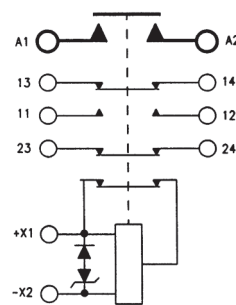
Circuit Configuration 8



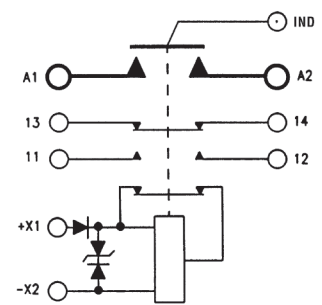
Circuit Configuration 9



Circuit Configuration 10



Circuit Configuration 11

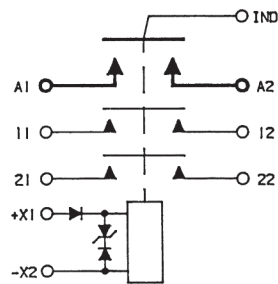


Circuit Configuration 12

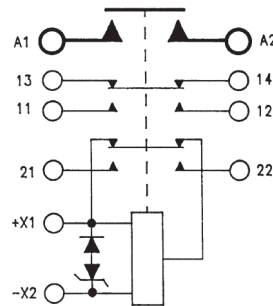
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

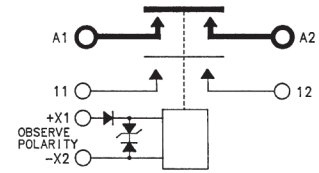
Circuit Configurations (Consult factory for other available circuit configurations)



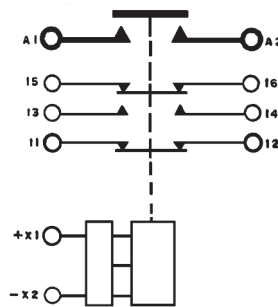
Circuit Configuration 13



Circuit Configuration 14



Circuit Configuration 15



Circuit Configuration 16

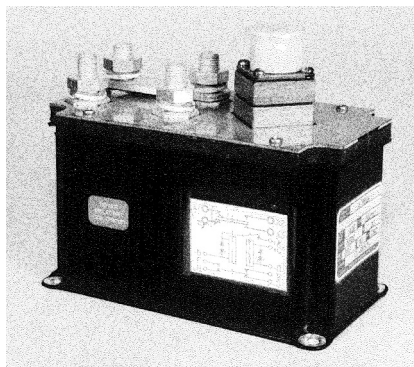
| HARTMAN Part Number | Construction Type | Mounting Style | Coil Type | Circuit Config. | TE Part Number |
|---------------------|---------------------|----------------|--------------------------------|-----------------|----------------|
| A-703 | Gasket/Vented | A | Continuous, Economized | 1 | 1616058-1 |
| 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

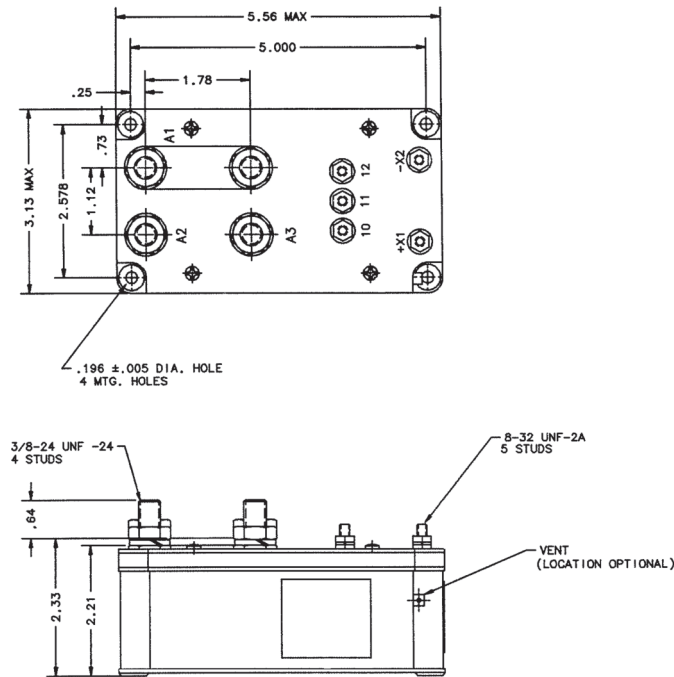
Operating Voltage, Min. — 17 Vdc

Pickup Voltage, Max. — 18 Vdc

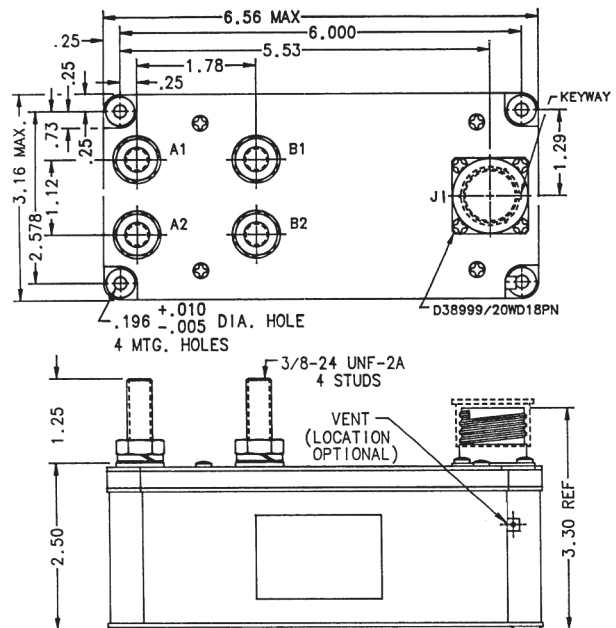
Dropout Voltage @ 25°C —
1 to 10 Volts

Coil Current, Inrush, Max. —
4.5 Amp

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

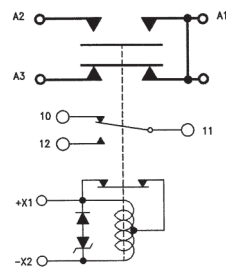


Mounting Style A

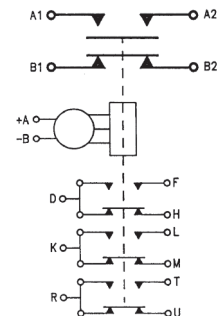


Mounting Style B

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

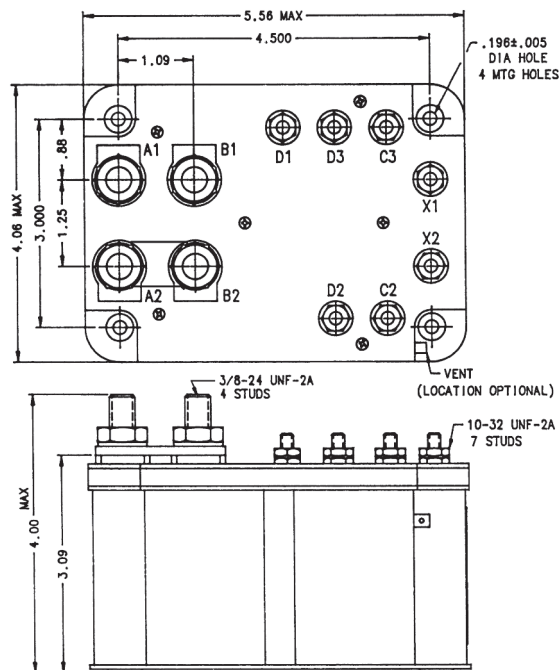
Pickup Voltage @ 25°C, Max. —
20 V

Resistance @ 25°C —

Pickup — 27 Ohm ± 20%

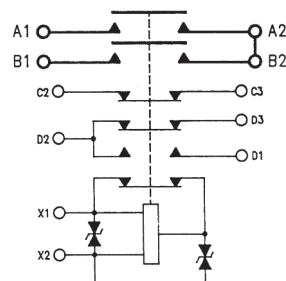
Hold — 111 Ohm ± 20%

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

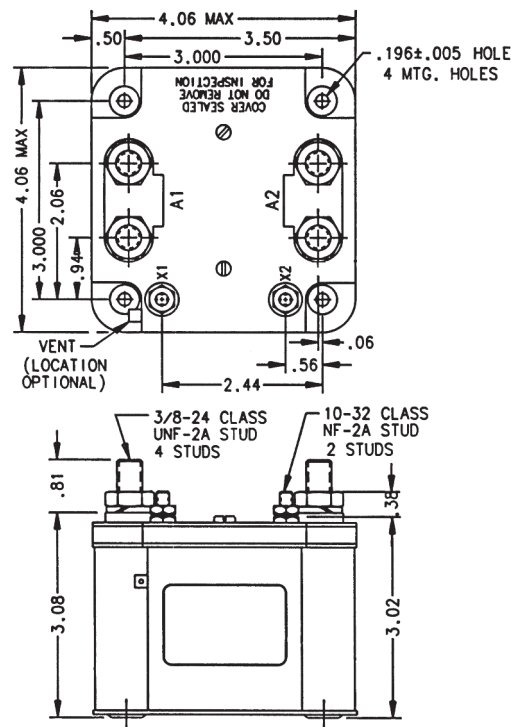
Operating Voltage, Max. — 29 Vdc

Coil Voltage, Nom. — 24-28 Vdc

Pickup Voltage, Max. — 18 Vdc

Dropout Voltage — 1 to 5 Vdc

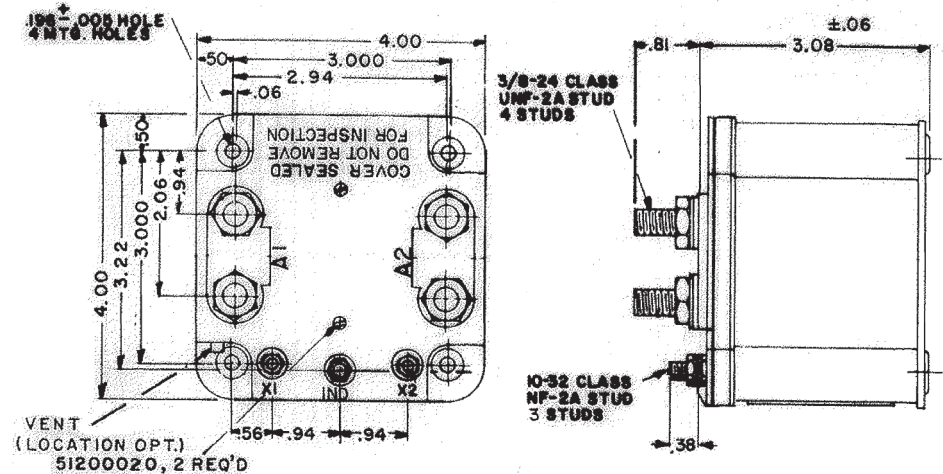
Coil Current, Hold, Max. —
0.6 Amp



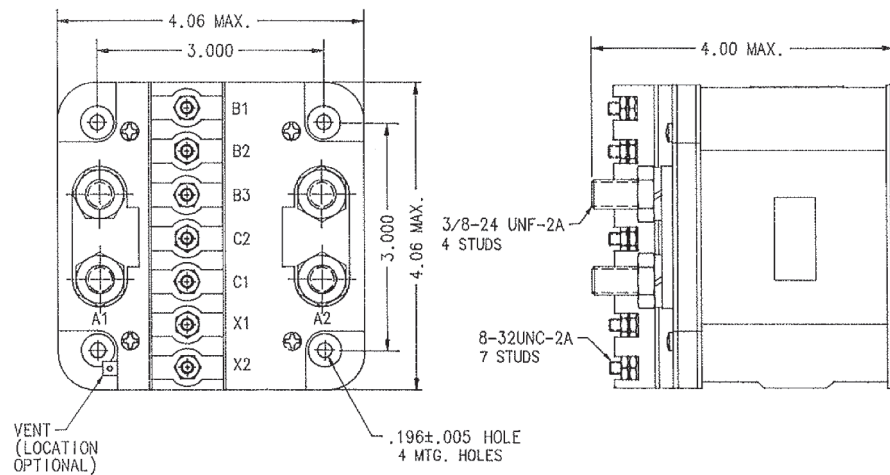
Mounting Style A

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)

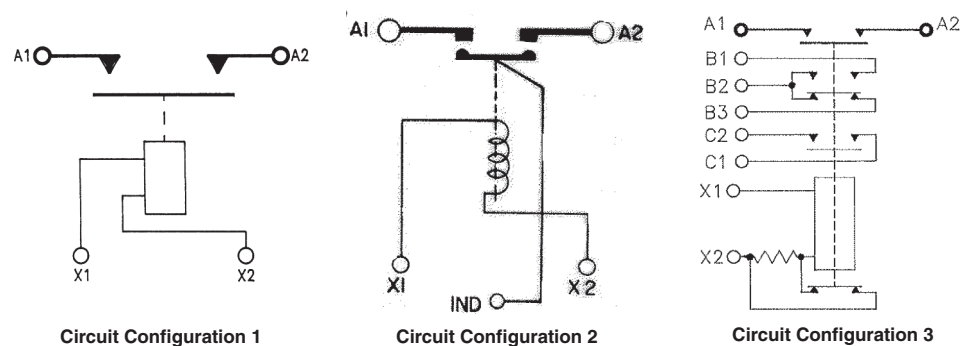


Mounting Style B



Mounting Style C

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

Circuit Configuration 2

Circuit Configuration 3

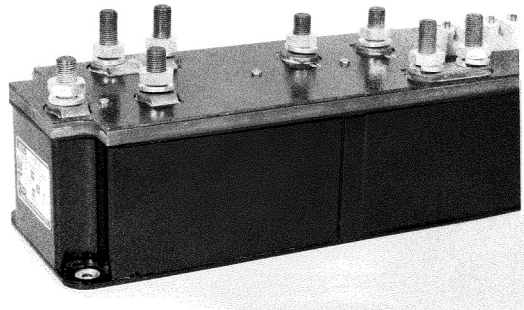
| HARTMAN Part Number | Construction Type | Mounting Style | Coil Type | Circuit Config. | TE Part Number |
|---------------------|-------------------|----------------|-------------------------|-----------------|----------------|
| A-712AB | Gasket/Vented | A | Continuous | 1 | 2-1616058-3 |
| A-712AF | 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

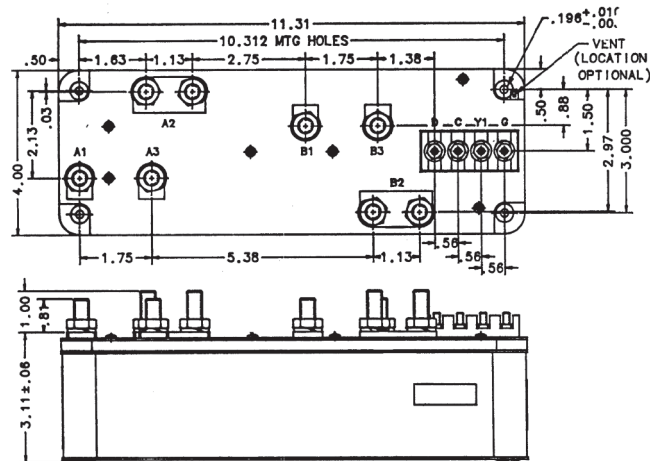
Operating Voltage, Min. — 18 Vdc

Pickup Voltage, Max., Hot — 18 Vdc

Dropout Voltage, Max., Hot — 7 Vdc

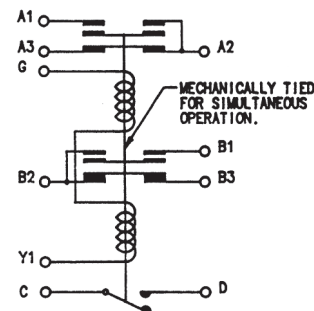
Coil Current, Max. @ 70°F —
8 Amps

Coil Current, Max. @ -65°F —
9.6 Amps



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

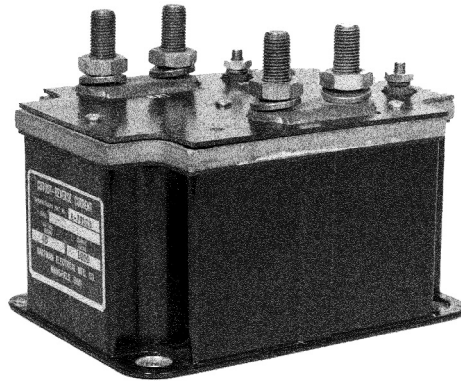
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

A-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

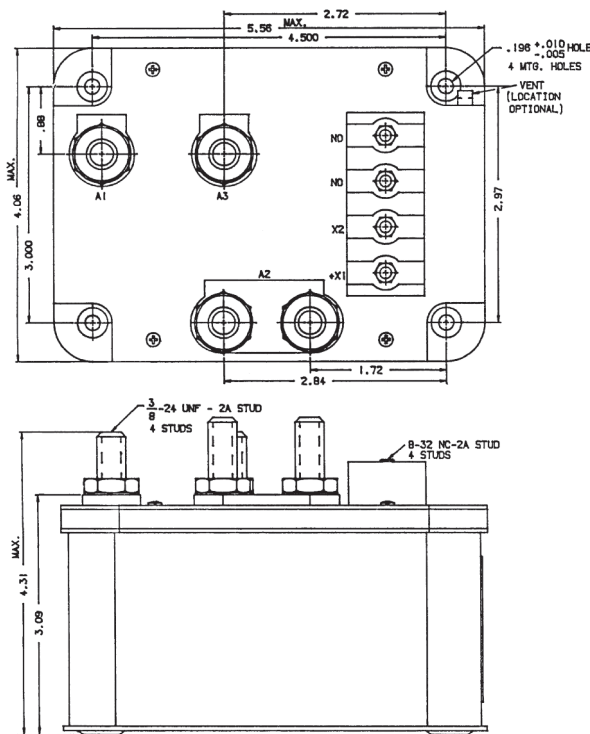
A-981E — 28 Vdc
A-981K — 24 Vdc min. to 30 Vdc max.

Pickup Voltage

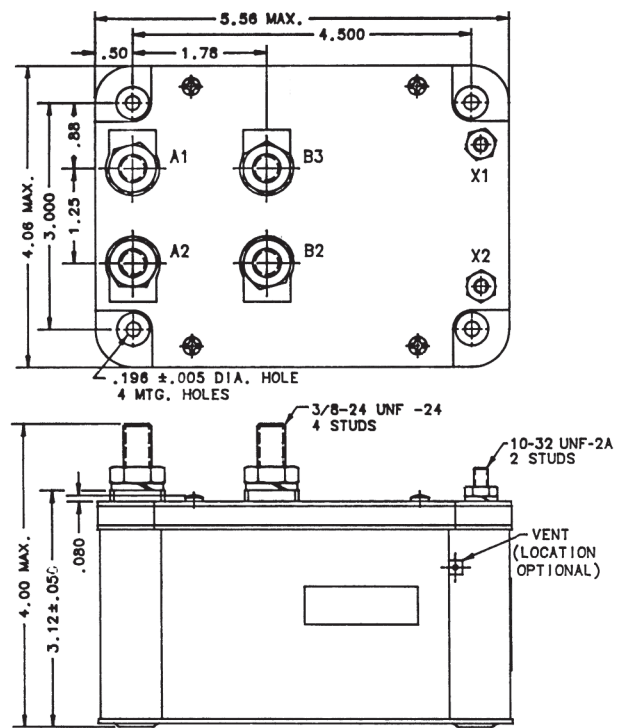
A-981E — 18 Vdc max. hot
A-981K — 16 Vdc max. initial @ 25°C

Dropout Voltage

A-981E — 10 Vdc max. hot
A-981K — 1 to 10 Vdc



Mounting Style A

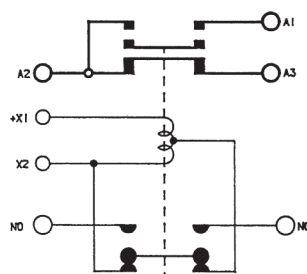


Mounting Style B

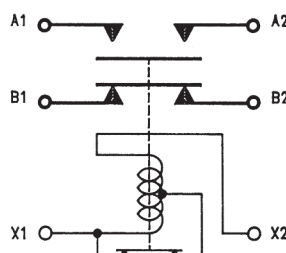
For factory-direct application
assistance, phone 419-521-9500 or
fax 419-526-2749.

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 |
| | | 28 | SPDT | Center Off | SPST NO | 28 | Hermetic | Cont. | — | DHR-31BA | 1616098-1 |
| 200 | DC | 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 |
| | | 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 |
| 300 | DC | 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 |
| | | 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 |
| 300 | DC | 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 |
| 400 | DC | 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 |
| 400 | DC | 28 | SPST NO | Side Stable | SPDT | 28 | Gasket/Vented | Cont. | 45 | A-400DC | 1616056-6 |
| | | 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 |
| 400 | DC | 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 |
| 400 | DC | 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 |
| 400 | DC | 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 |
| | | 28 | SPST NO | Side Stable | Form Z SPST NC | 24-30 | Gasket/Vented | Int. | 45 | A-703FA | 1-1616058-2 |
| 400 | DC | 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 |
| 400 | DC | 28 | SPST NO | Side Stable | Form Z SPDT Form Z | 18-31 | Gasket/Vented | Cont. Econ. | – | A-703GC | 1-1616058-6 |
| | | 28 | SPST NO | Side Stable | SPST NC | 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 |
| 400 | DC | 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 |
| 400 | DC | 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 |
| 600 | DC | 29 | SPST NO | Side Stable | – | 24-28 | Gasket/Vented | Cont. | – | A-712AB | 2-1616058-3 |
| | | 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 ± 3 Vrms

Dropout Voltage — 100 ± 2 Vrms

Dropout Time, Min. — 40 msec

General Characteristics

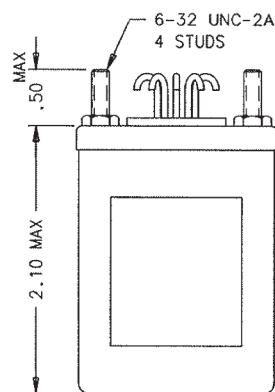
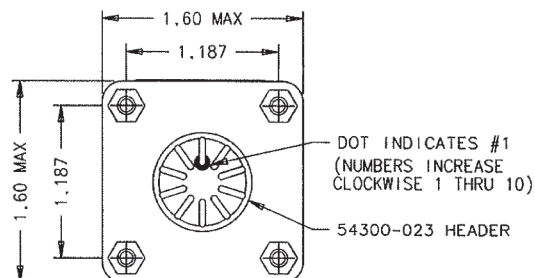
Temperature Range —

-55°C to +85°C

Operating Cycles (Life)

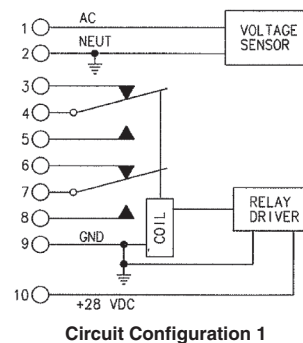
Mechanical, Min. — 100,000 cycles

Weight, Max. — 6 oz.



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

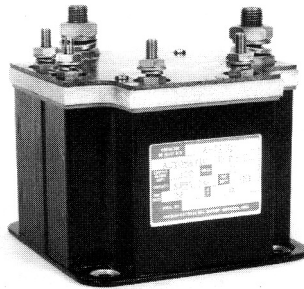
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

| 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 \pm 10%

Time Delay — 900 to 1,100 msec

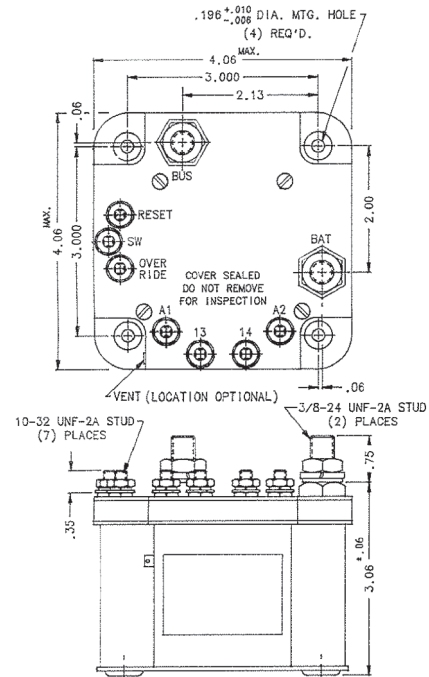
Sensor Contacts, Aux.

Sensor Contact Arrangement —
SPST NO

Rated Operating Voltage — 28 Vdc

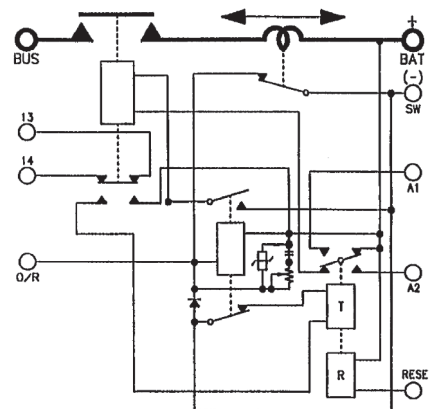
Resistive Rating — 3 Amps

Reset Rating, Max. — 18 V



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

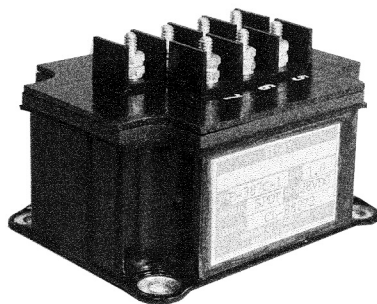
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

| 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

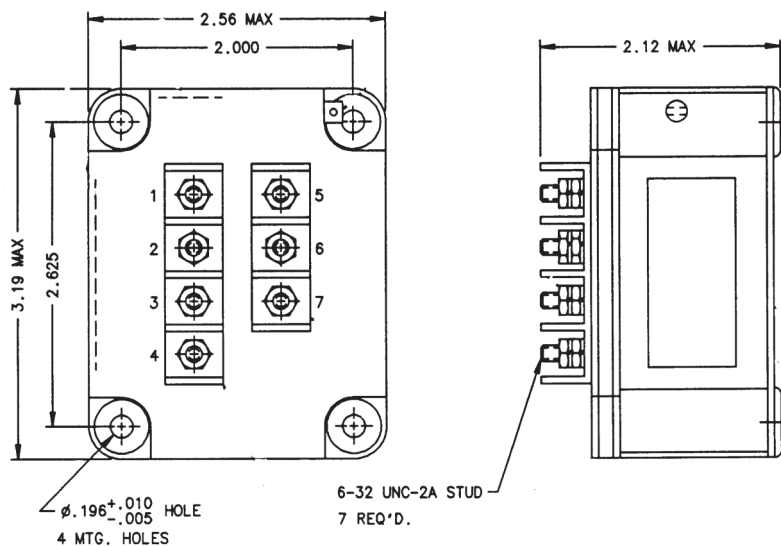
Control Power — 28 Vdc

Sensor Input — 400 Hz \pm 100 Hz

Pickup Current — 14 \pm 2 Amps

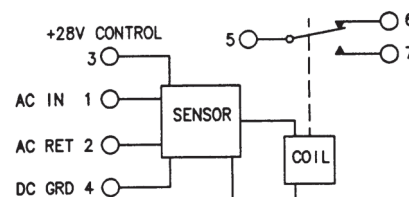
Dropout Current — 7 \pm 1 Amp

Continuous Sensor Current — 25 Amp, max.



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

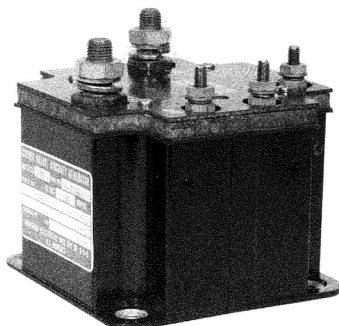
| HARTMAN Part Number | Construction Type | Mounting Style | Coil Type | Circuit Config. | TE Part Number |
|---------------------|-------------------|----------------|------------|-----------------|----------------|
| E-387C-1 | Gasket/Vented | A | Continuous | 1 | 2-1616126-3 |

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

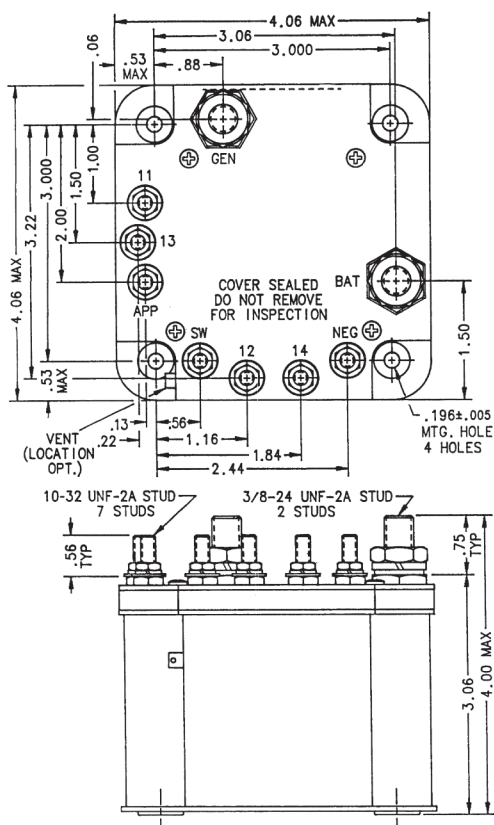
General Characteristics

Weight, Max. — 3 lbs 1 oz

Coil Characteristics

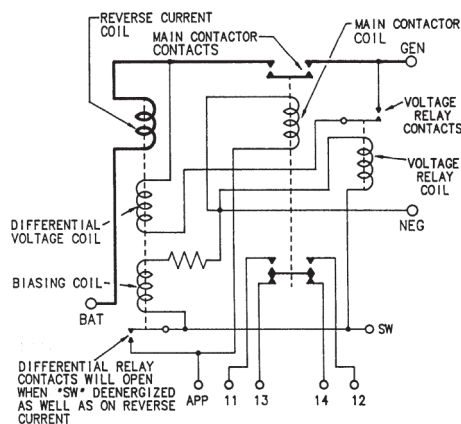
Duty Cycle — Continuous

*Over a Voltage Range of 27.5 ± 2.5 Vdc



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

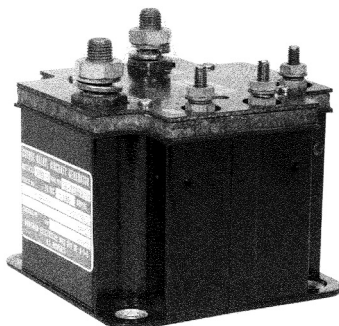
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

| 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** — $.85 \pm .15$ V

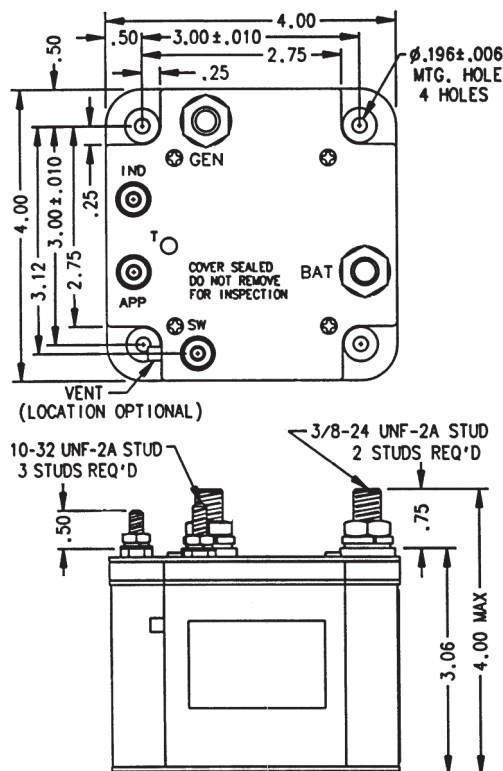
General Characteristics

- Temperature Range** — -55°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.
- Weight, Max.** — 2 lbs 15 oz

Coil Characteristics

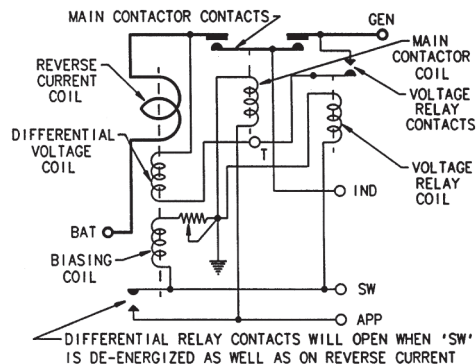
- Duty Cycle** — Continuous

*Over a Voltage Range of 27.5 ± 2.5 Vdc and Calibrated at 12 ± 1 Amp RC at 28 Vdc & $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

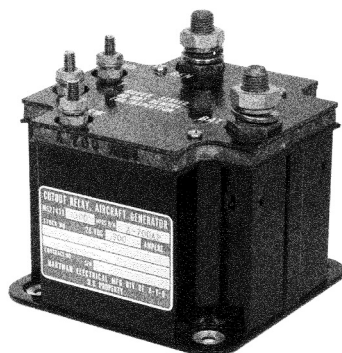
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

| 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°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

Weight. Max. —

A-700AAP — 2.9 lbs

A-700ZC-7, A-700ZG — 2.5 lbs

Coil Characteristics

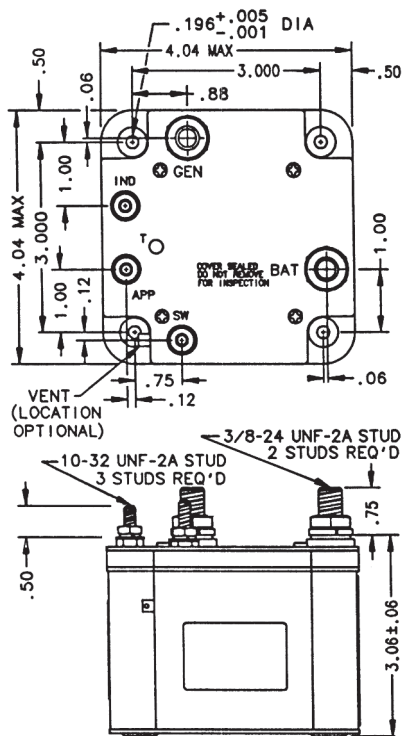
Duty Cycle — Continuous

Duty Cycle when using “APP” —
Intermittent

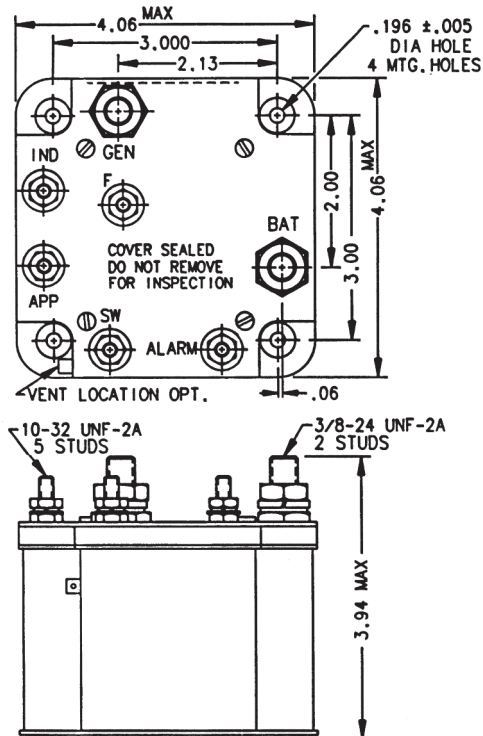
Nom. Coil Voltage — 24 to 30 Vdc

Pickup Voltage, Max. — 18 Vdc

Dropout Voltage — 0.5 to 7.0 Vdc



Mounting Style A

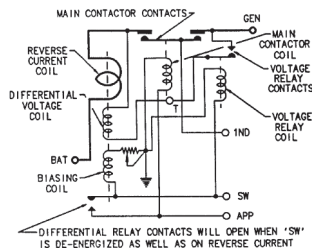


Mounting Style B

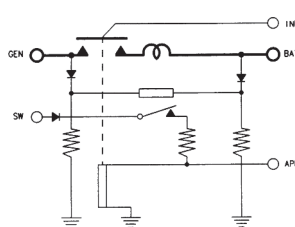
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

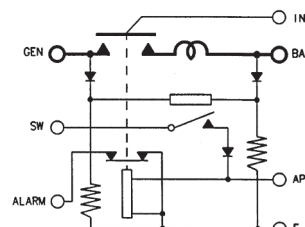
Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 2



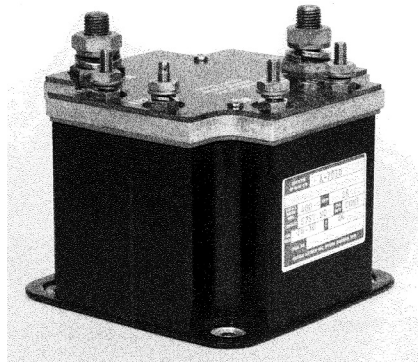
Circuit Configuration 3

| 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 |

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 — $0.5 \pm .15$ 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

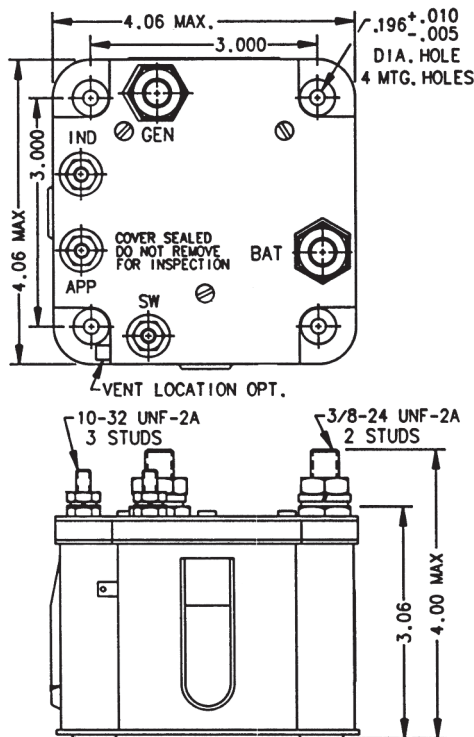
Nom. Coil Voltage — 24 to 30 Vdc

Pickup Voltage, Max. —

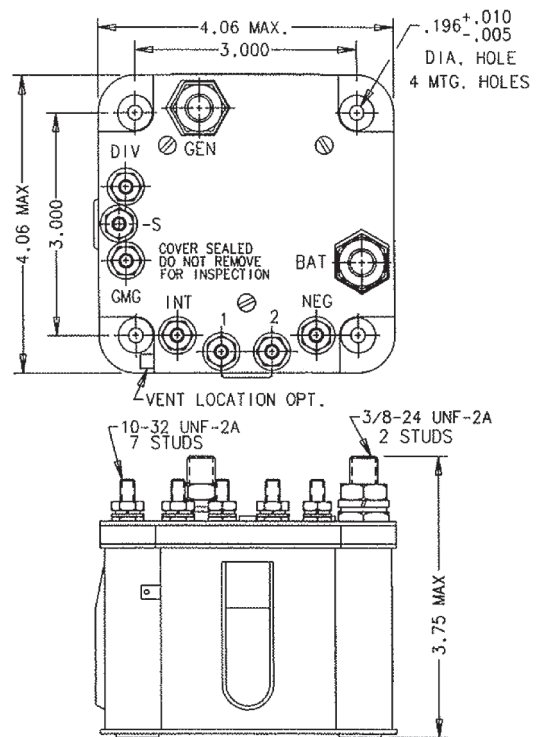
A-701D — 15 Vdc

A-701C — 12 Vdc

Dropout Voltage — 0.5 to 7.0 Vdc



Mounting Style A

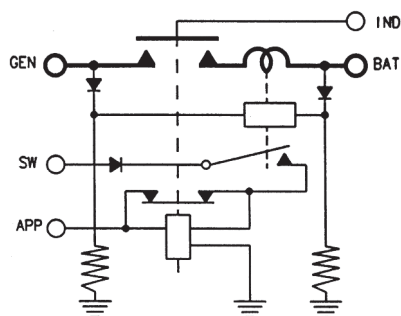


Mounting Style B

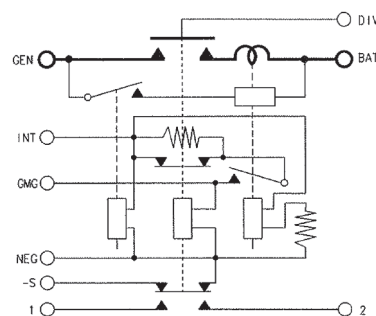
For factory-direct application
assistance, phone 419-521-9500 or
fax 419-526-2749.

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 |

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°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

Weight, Max. — 3.9 lbs.

Coil Characteristics

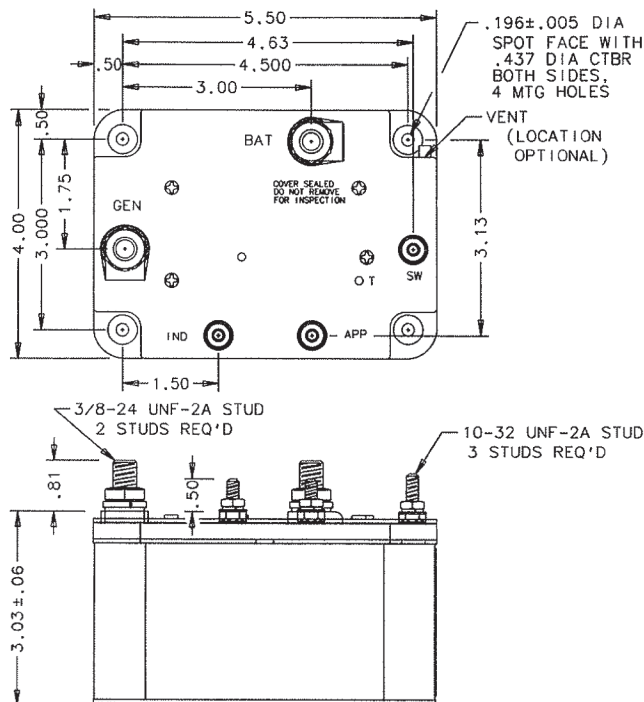
Duty Cycle — Continuous

Duty Cycle when using "APP" —
Continuous

Nom. Coil Voltage — 24 to 30 Vdc

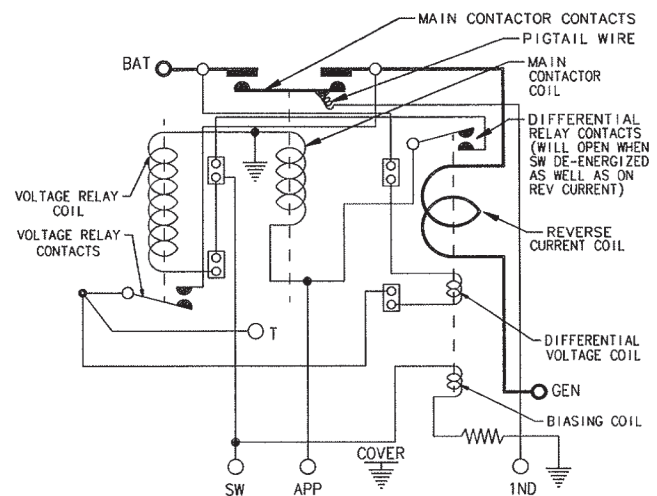
Pickup Voltage, Max. — 18 Vdc

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 ± 0.13 G,
15.5-54 CPS 0.01 inch DA,
54-500 CPS ± 1.5 G

Shock, Max. — 10 G 30 ± 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 ± 5 volts 3 \emptyset (highest of 3 \emptyset)

High side frequency "off" limits — 425 ± 5 CPS

Low side frequency "off" limits — 375 ± 5 CPS

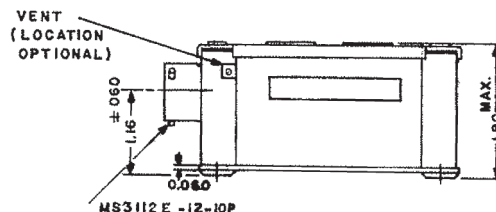
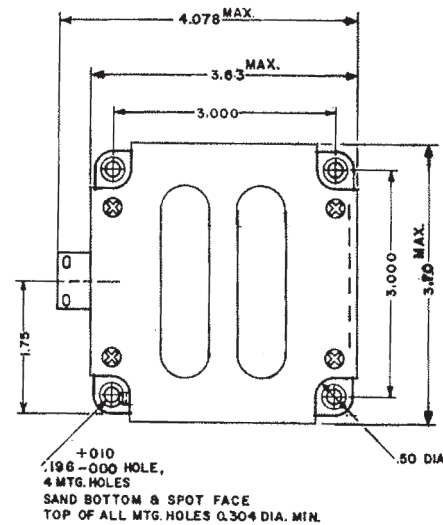
Voltage Transient Limits

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

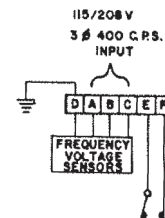
Over and Under frequency time delay 3 ± 1 sec.

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

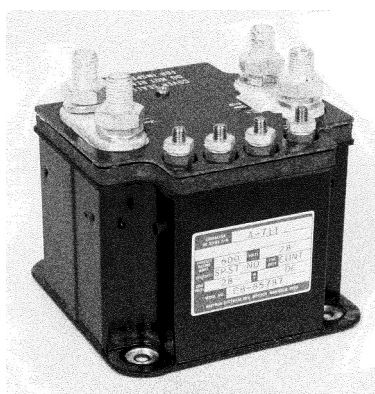
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

| 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 — 13
and S2 — 235 ± 20 Amps

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

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

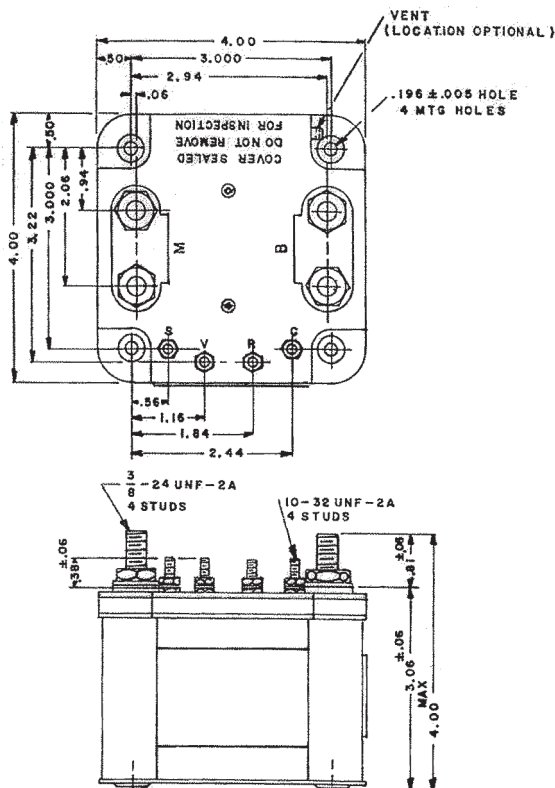
A-711Z — 0.6 Amp

A-711R — 1.0 Amp

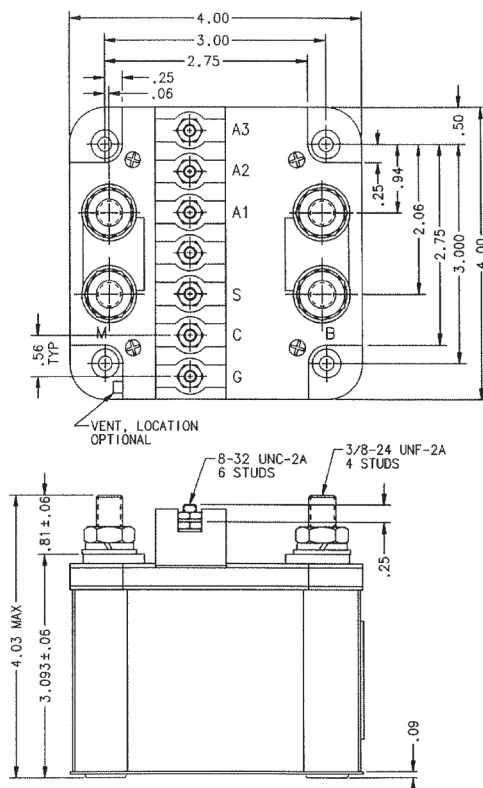
Coil Voltage, Nom. — 28 Vdc

Signal Resistor — 20 Ohm \pm 10%,
20 W

Coil Res., "C" Term. to "GND" —
36 Ohm \pm 10%



Mounting Style A

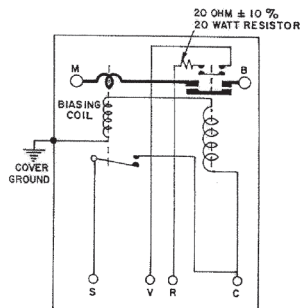


Mounting Style B

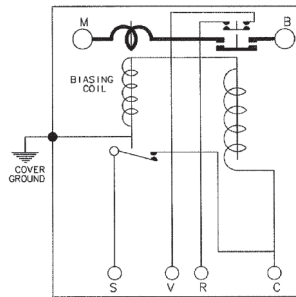
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

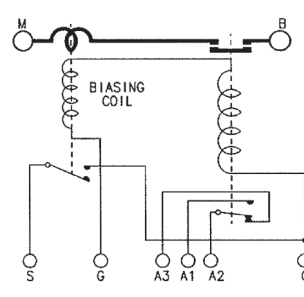
Circuit Configurations (Consult factory for other available circuit configurations)



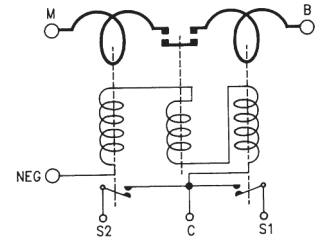
Circuit Configuration 1



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

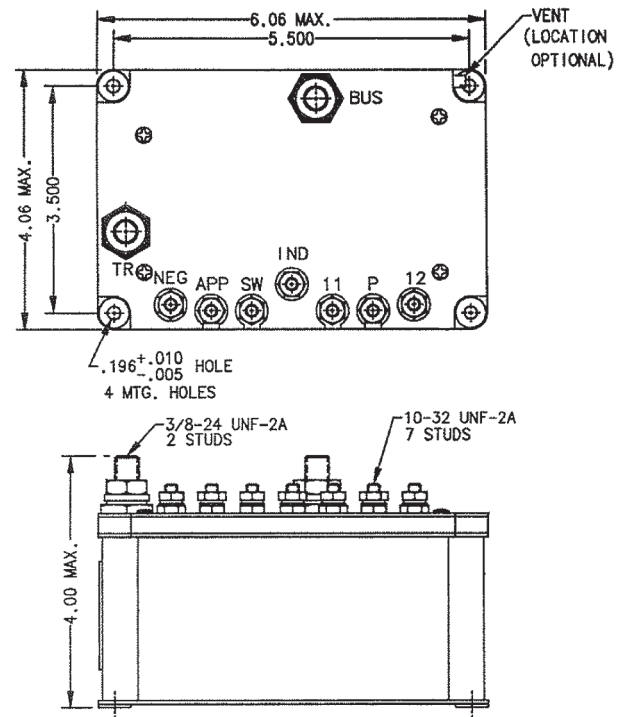
Altitude, Max. — 50,000 ft

Weight, Max. — 4 lbs 8 oz

Coil Characteristics

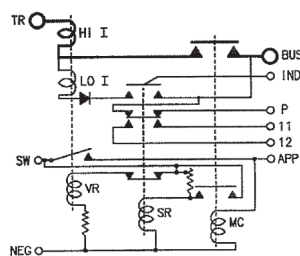
Duty Cycle — Continuous

Coil Voltage, Nom. — 24 to 30 Vdc

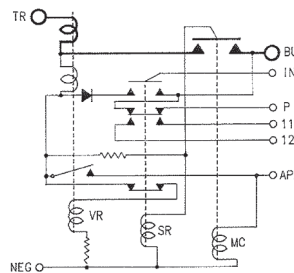


Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 2

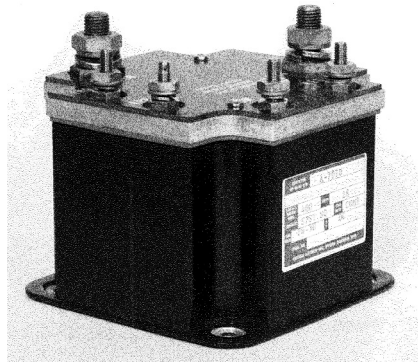
| HARTMAN Part Number | Construction Type | Mounting Style | Coil Type | Circuit Config. | TE Part Number |
|---------------------|-------------------|----------------|------------|-----------------|----------------|
| A-957CSD | Gasket/Vented | A | Continuous | 1 | 1616110-6 |
| A-957G | Gasket/Vented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

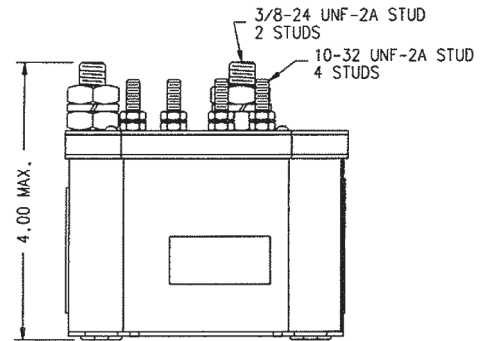
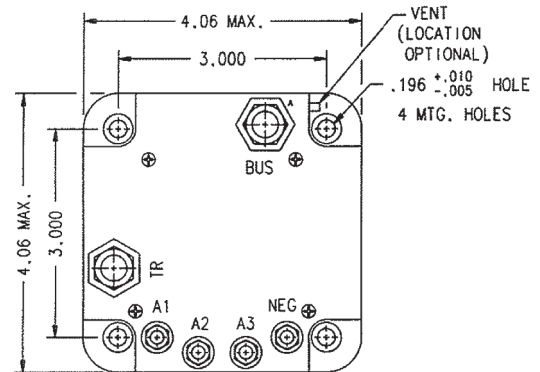
Mechanical — 100,000 cycles

Weight, Max. — 3.5 lbs

Coil Characteristics

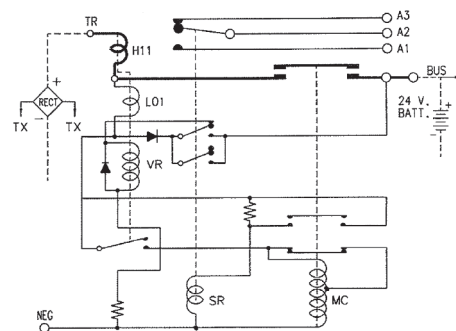
Duty Cycle — Continuous

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

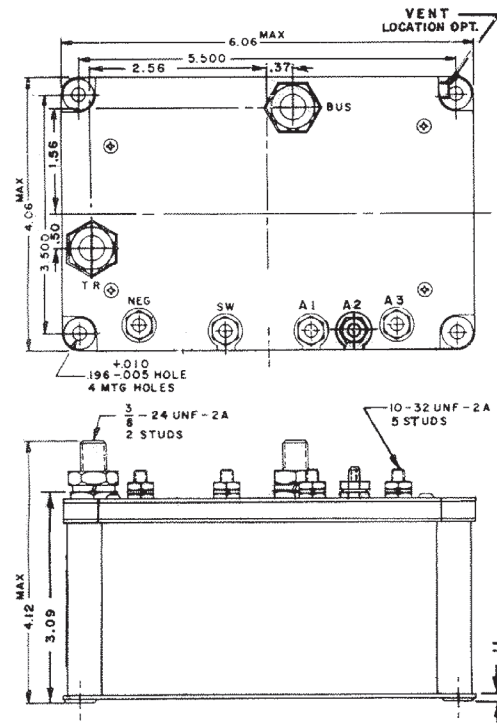
Altitude, Max. — 50,000 ft

Weight, Max. — 4 lbs 8 oz

Coil Characteristics

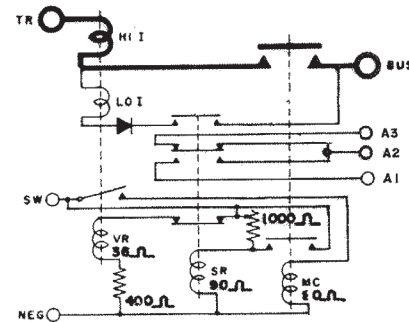
Duty Cycle — Continuous

Coil Voltage, Nom. — 24 to 30 Vdc



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

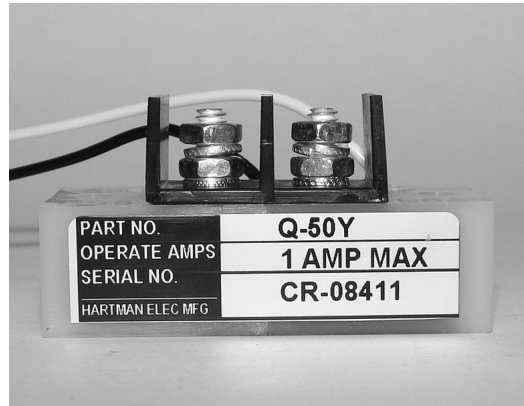
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

| 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

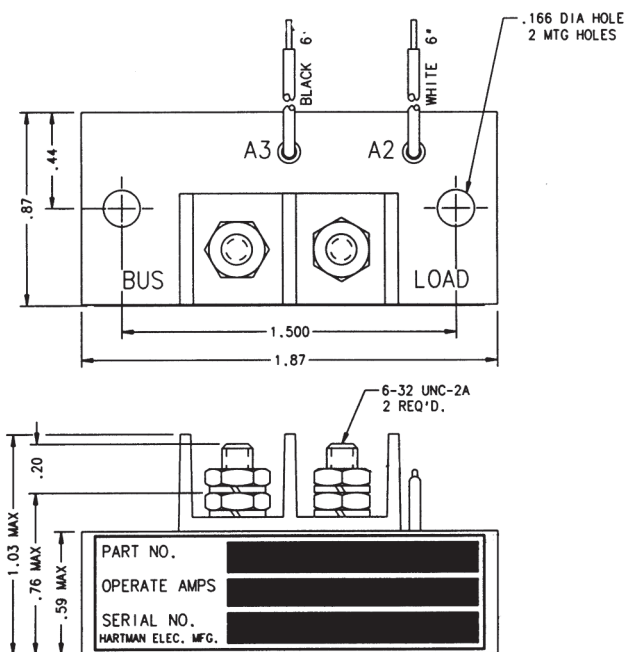
General Characteristics

Temperature Range —

-55°C to +71°C

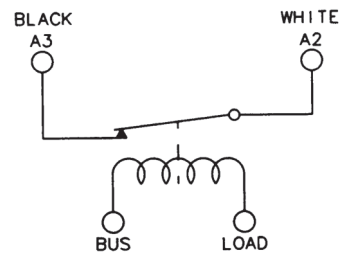
Altitude, Max. — 50,000 ft

Weight, Max. — 1.25 oz



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

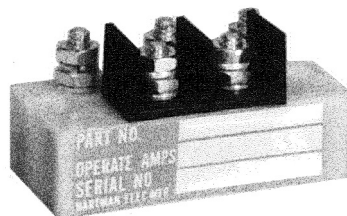
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

| 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

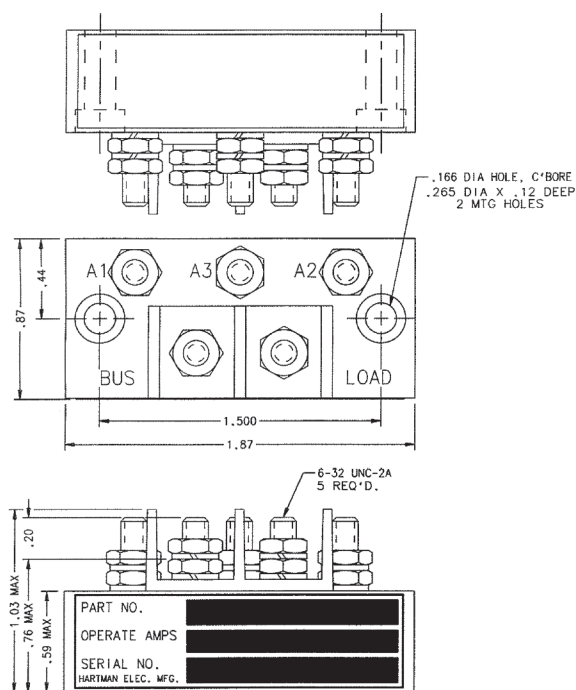
General Characteristics

Temperature Range —

-55°C to +71°C

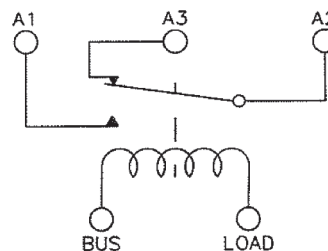
Altitude, Max. — 50,000 ft

Weight, Max. — 1.25 oz



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

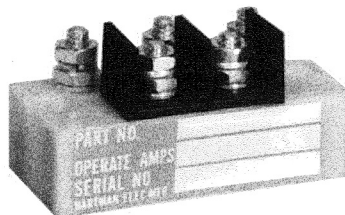
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

| 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

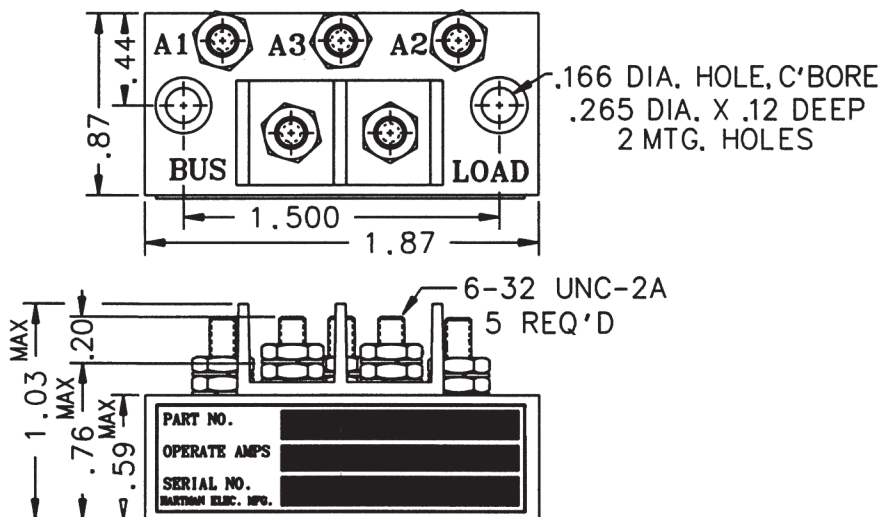
General Characteristics

Temperature Range —

-55°C to +71°C

Altitude, Max. — 50,000 ft

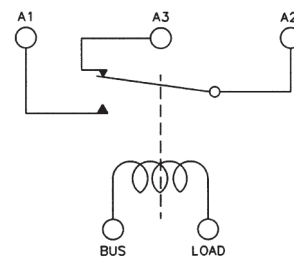
Weight, Max. — 1.25 oz



Mounting Style A

Circuit Configurations

(Consult factory for other available circuit configurations)



Circuit Configuration 1

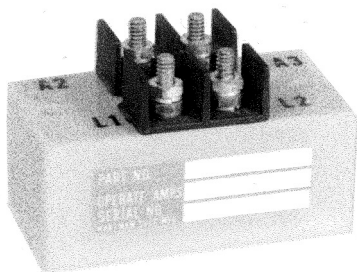
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

| HARTMAN Part Number | Construction Type | Mounting Style | Coil Type | Circuit Config. | TE Part Number |
|---------------------|------------------------|----------------|------------|-----------------|----------------|
| 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 |

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

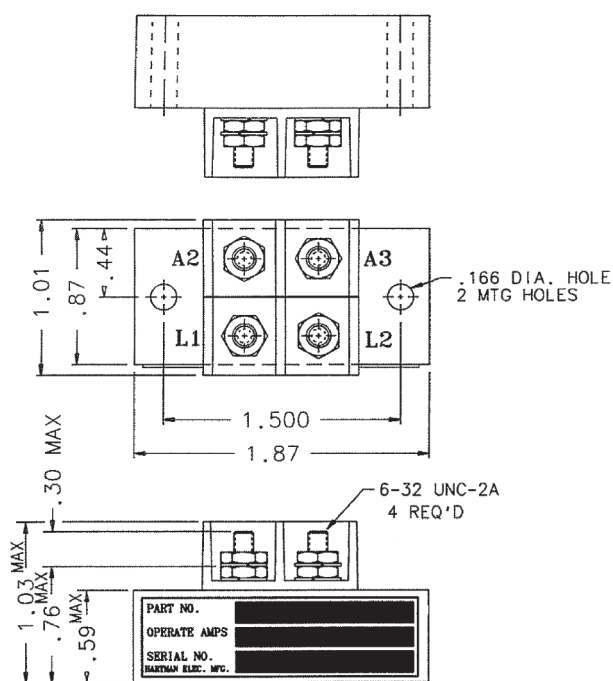
Dropout Min. — 0.5 Amp

General Characteristics

Temperature Range —
-55°C to +71°C

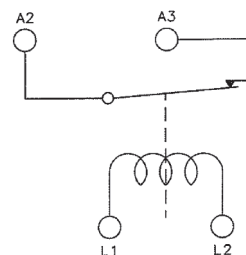
Altitude, Max. — 50,000 ft

Weight, Max. — 1.25 oz



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



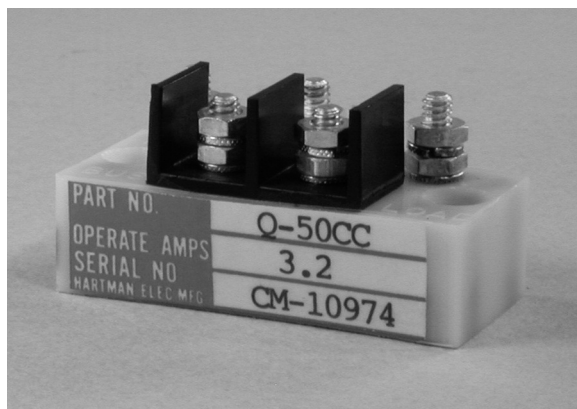
Circuit Configuration 1

| 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

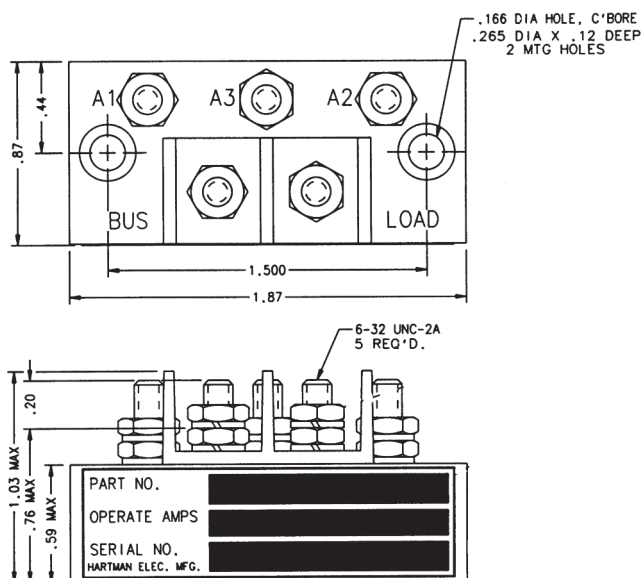
Dropout Min. — 1.2 Amps

General Characteristics

Temperature Range —
-55°C to +85°C

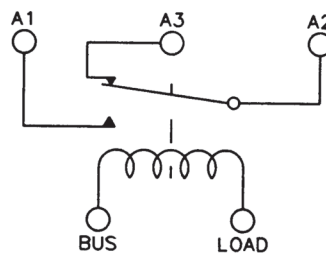
Altitude, Max. — 50,000 ft

Weight, Max. — 1.25 oz



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

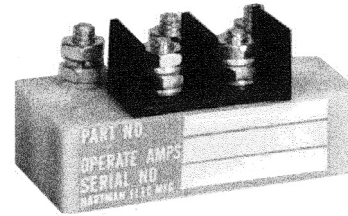
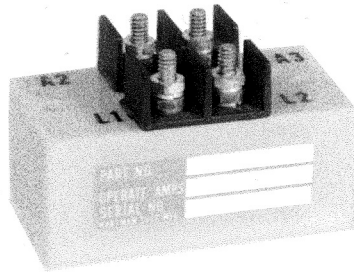
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

| 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

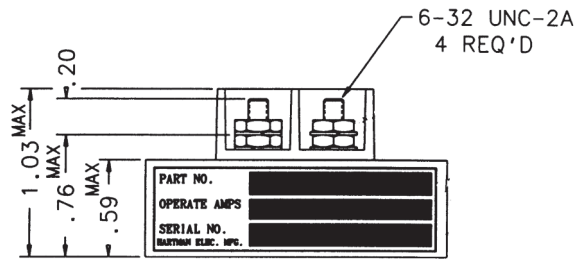
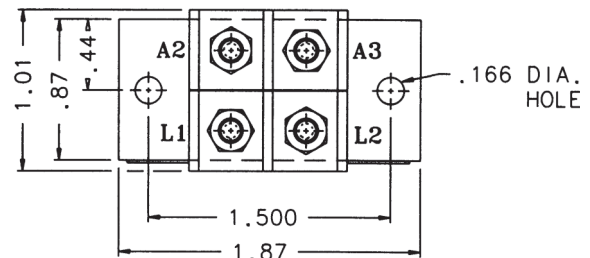
General Characteristics

Temperature Range —

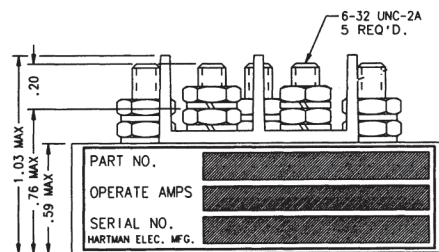
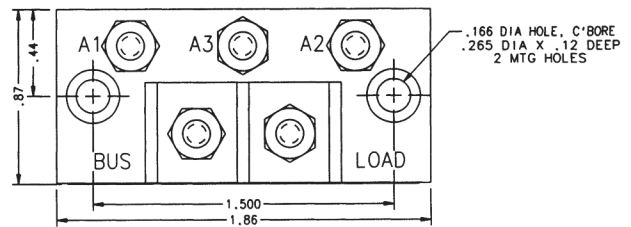
-55°C to +71°C

Altitude, Max. — 50,000 ft

Weight, Max. — 1.25 oz

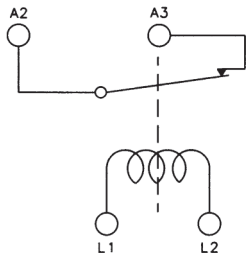


Mounting Style A

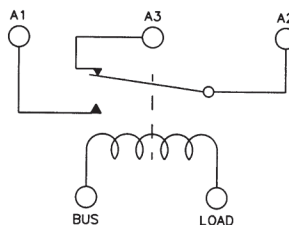


Mounting Style B

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 1

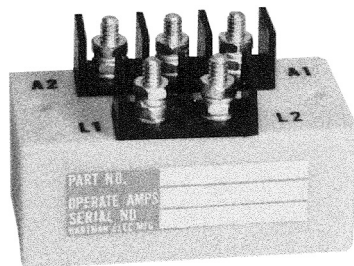
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

| HARTMAN Part Number | Construction Type | Mounting Style | Duty Cycle | Circuit Config. | TE Part Number |
|---------------------|------------------------|----------------|------------|-----------------|----------------|
| Q-50S | Environmentally Sealed | A | Continuous | 1 | 1-1616131-1 |
| Q-50Z | Environmentally Sealed | A | Continuous | 2 | 1-1616131-3 |

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 $\pm 20\%$

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

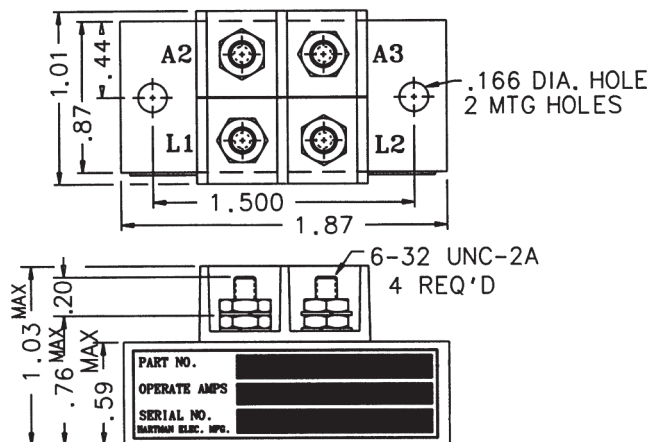
General Characteristics

Temperature Range —
-55°C to +71°C

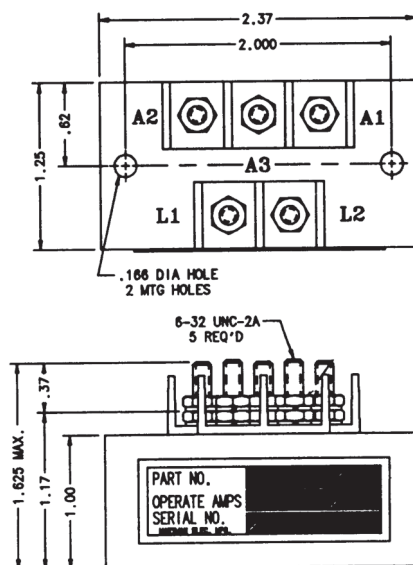
Altitude, Max. —

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

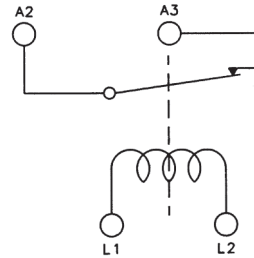


Mounting Style B

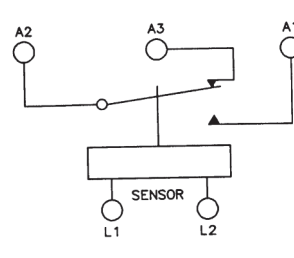
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

Q-50 Series Relay, Current Indicator, Rated up to 20 Amps, 28 Vdc (Continued)

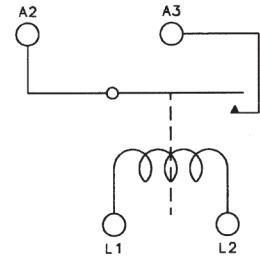
Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 2



Circuit Configuration 3

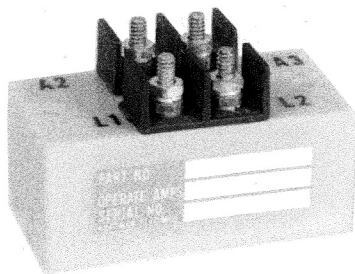
| HARTMAN Part Number | Construction Type | Mounting Style | Duty Cycle | Circuit Config. | TE Part Number |
|---------------------|------------------------|----------------|------------|-----------------|----------------|
| Q-50J | Environmentally Sealed | A | Continuous | 1 | 1-1616131-0 |
| Q-50AC | 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. —

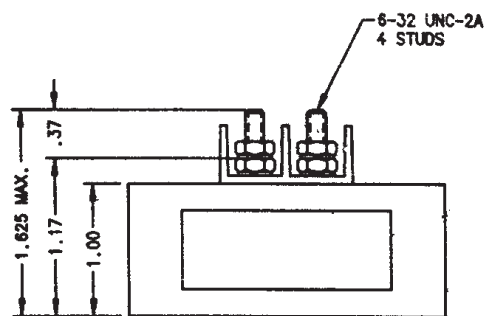
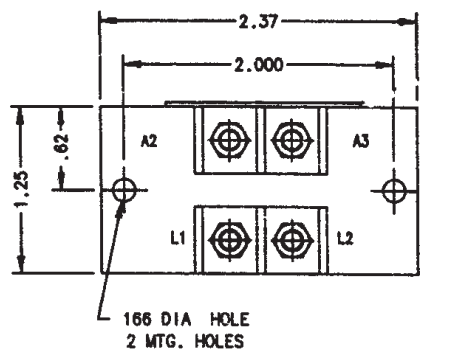
115 Vrms, 325-600 Hz

Pickup Max. —

95 MA, AC

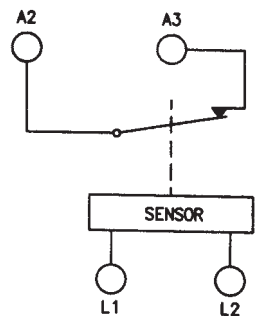
Dropout Min. —

47 MA AC



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

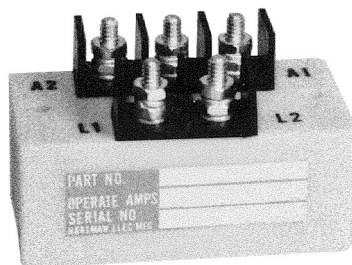
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

| HARTMAN Part Number | Construction Type | Mounting Style | Duty Cycle | Circuit Config. | TE Part Number |
|---------------------|------------------------|----------------|------------|-----------------|----------------|
| QR-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

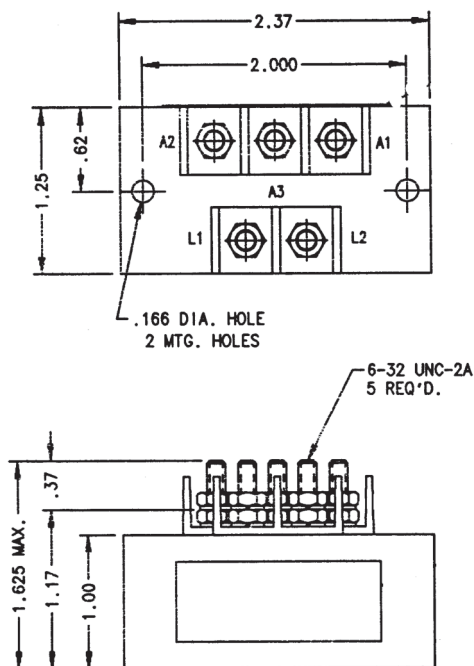
General Characteristics

Temperature Range —
-55°C to +71°C

Altitude — 50,000 ft

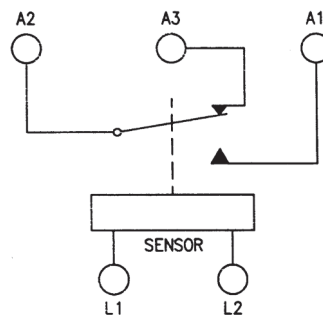
Weight, Max. — .19 lbs

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

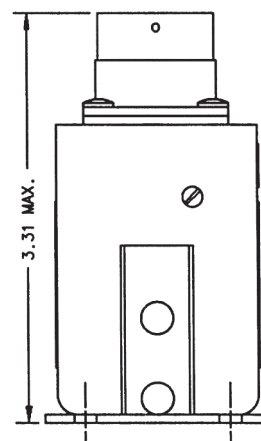
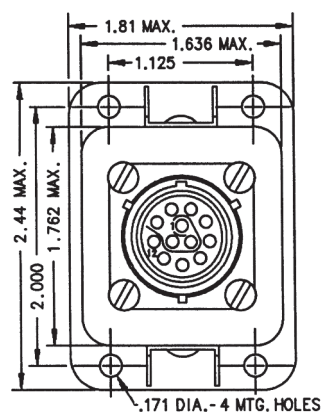
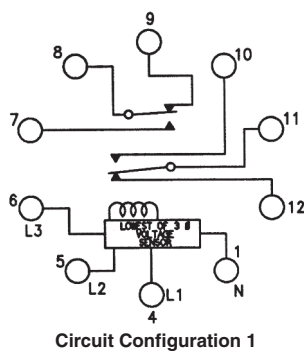
Operating Cycles (Life) at Rated
Resistive Load, Min. —
10,000 cycles

Weight, Max. — 10 oz.

Operating Voltage, Max. —
124 VAC

Circuit Configurations

(Consult factory for other
available circuit configurations)



Mounting Style A

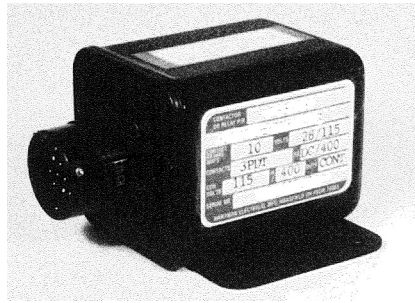
For factory-direct application
assistance, phone 419-521-9500 or
fax 419-526-2749.

| 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 ± 0.5 Vdc

Dropout Voltage — 21.5 ± 0.5 Vdc

Dropout Time Delay — 200-400 milliseconds when the relay is in the energized position and the voltage drops below 21.5 ± 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

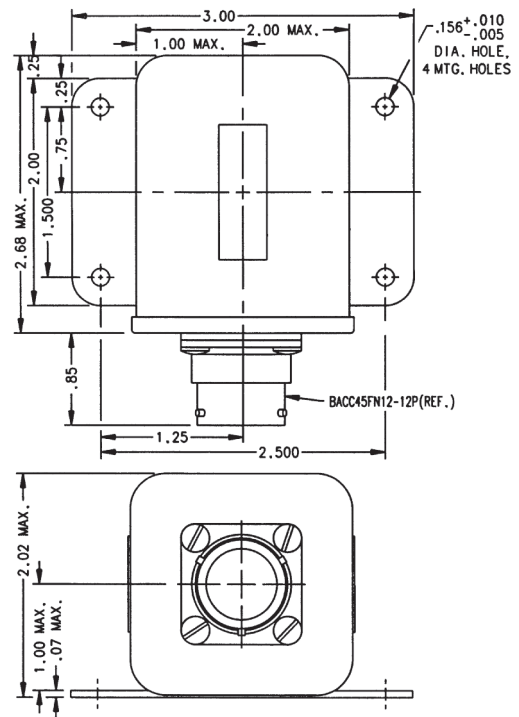
Sinusoidal Vibration —

.060 DA @ 5 to 80 Hz

20 G TM 80 to 2000 Hz

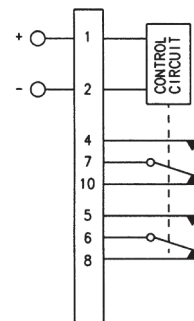
Shock for 11 msec, 1/2 Sine, 3

Axes — 30 G



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

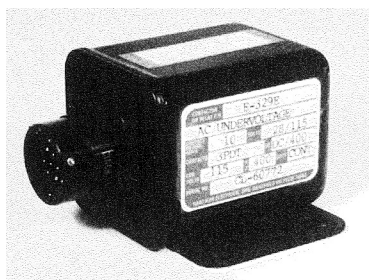
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

| 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 ± 2 Vrms and above 88 ± 4 Vrms. The relay will remain energized for 200-400 msec before deenergizing.

When the voltage drops below 88 ± 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 ± 20 Hz

Pickup Voltage — 109 ± 2 Vrms

Dropout Voltage — 104 ± 2 Vrms

Operating Current, Max. @ 25°C —
100 milliamp

General Characteristics

Temperature Range —

-55°C to +85°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

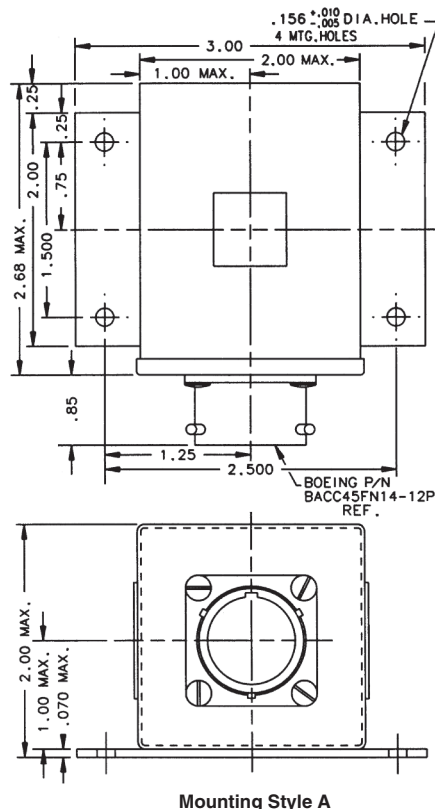
Insulation Resistance @ 500 Vdc —

1,000 megohm min.

Altitude — 0-80,000 ft

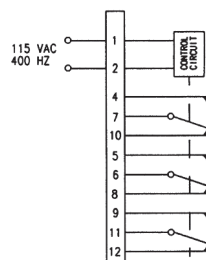
Weight, Max. — 10 oz

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

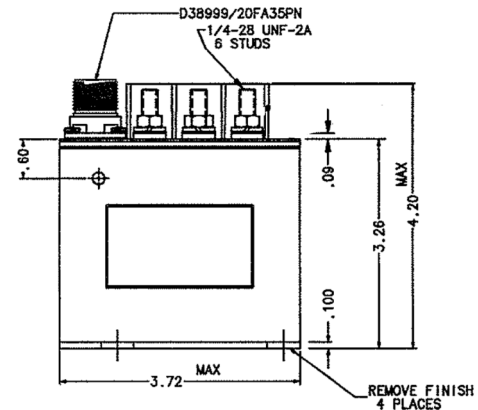
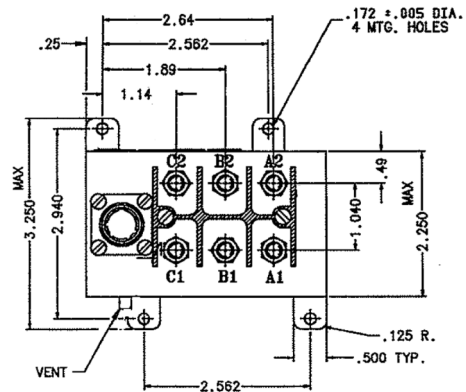
Temperature Range —
-55°C to +85°C

Operating Cycles (Life)

Mechanical, Min. — 100,000 cycles

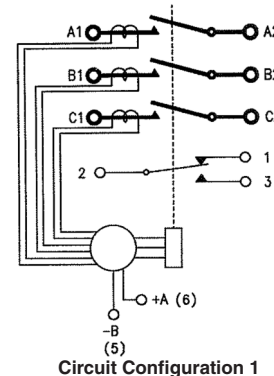
Altitude — 50,000 ft

Weight, Max. — 1.55 lbs



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

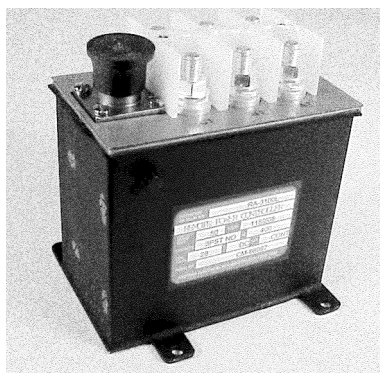
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

| 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

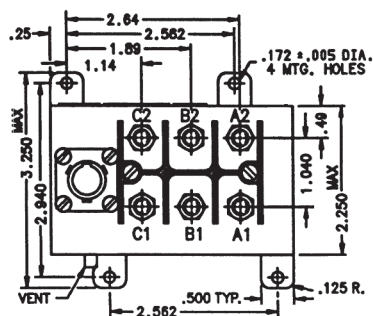
10g from 55 to 2000 Hz

Shock, Max. — 9 G max for 10-12 ms

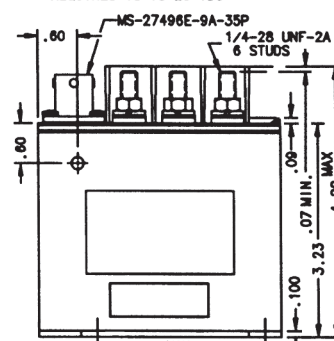
Load, Min. — 50,000 cycles

Operating Cycles (Life)

Mechanical, Min. — 100,000 cycles

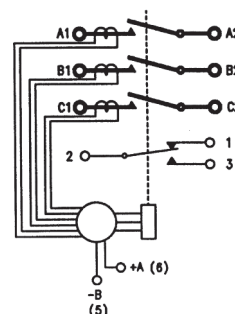


NOTE: FOR PROPER OPERATION, PIN A
REQUIRES 18 TO 28 VDC



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

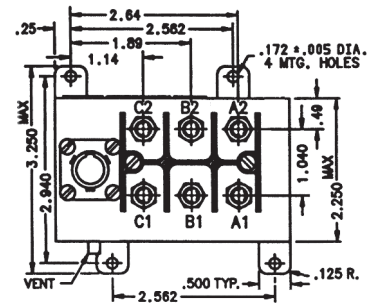
Operating Cycles (Life) at Rated Load, Min. — 50,000 cycles

Operating Cycles (Life)

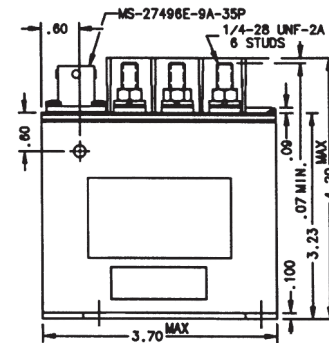
Mechanical, Min. — 100,000 cycles

Altitude — 50,000 ft

Weight, Max. — 1.55 lbs

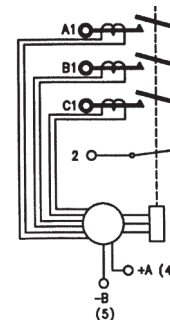


NOTE: FOR PROPER OPERATION, PIN A REQUIRES 18 TO 28 VDC



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

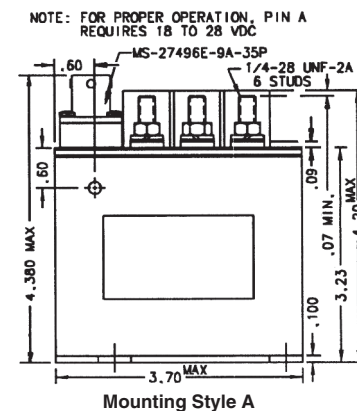
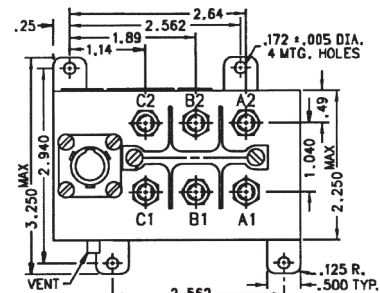
Load, Min. — 50,000 cycles

Operating Cycles (Life)

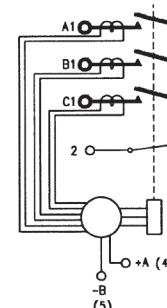
Mechanical, Min. — 100,000 cycles

Altitude — 60,000 ft

Weight, Max. — 1.55 lbs



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

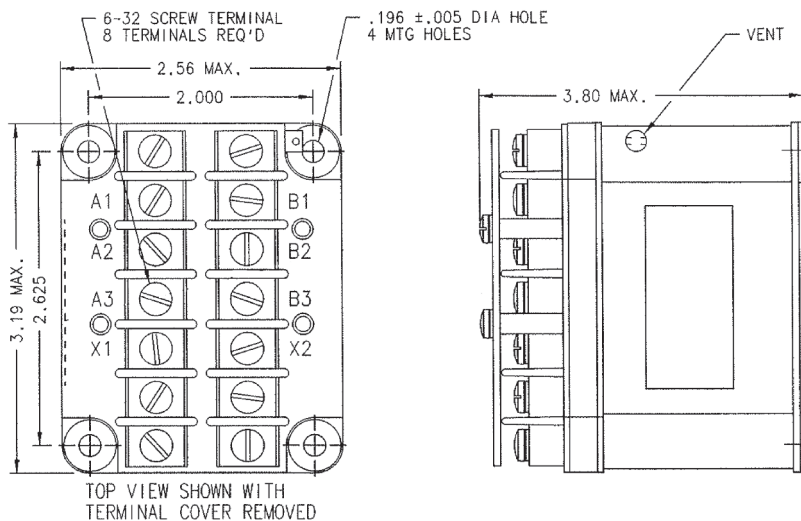
Coil Characteristics

Duty Cycle — Continuous

Input to Sensor, Nom. —
 120 V, 400 Hz

Operating Characteristic —

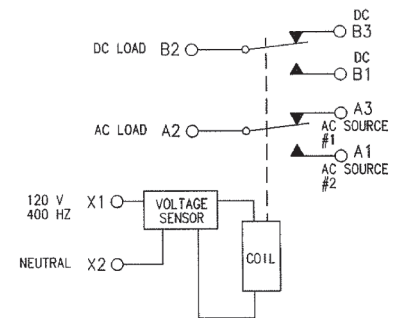
Contacts A1-A2, B1-B2 will close if the AC input voltage is above 106 ± 2 VAC
 Contacts A1-A2, B1-B2 will open if the AC input voltage falls below 106 ± 2 VAC.



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 |

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