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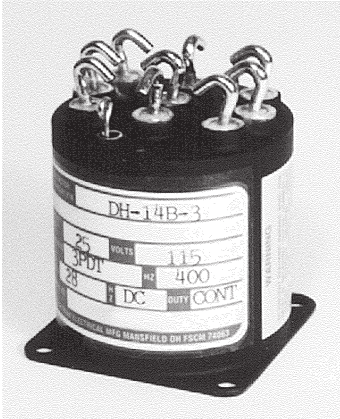
Engineering Notes

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

Product Facts

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



Performance Data

Electrical Characteristics

Contact Arrangement — 3PDT

Rated Operating Voltage — 115/200 VAC, 400 Hz

Resistive Rating — 25 Amps

Inductive Rating — 20 Amps

Motor Rating — 15 Amps

General Characteristics

Temperature Range — -55°C to +71°C

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

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

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

Insulation Resistance, Initial — 100 megohm min.

Altitude — 80,000 ft.

Weight, Max. — .41 to .50 lbs

Duty Cycle —
VAC 400 Hz — AC Continuous (Type A, See diagram below)
Vdc — Continuous or continuous with suppression (See diagram B & C below)

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

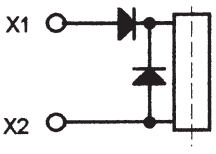
Pickup Voltage @ 25°C, Max. —
VAC 400 Hz — 95 VAC
Vdc — 18 Vdc

Dropout Voltage @ 25°C, Max. —
VAC 400 Hz — 25 VAC
Vdc — 1.5 to 7 Vdc

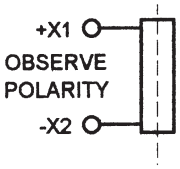
Coil Resistance ±20% @ 25°C —
VAC 400 Hz — N/A
Vdc — 290 Ohms

Coil Characteristics

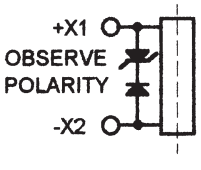
Coil Type



A — AC Continuous



B — Continuous

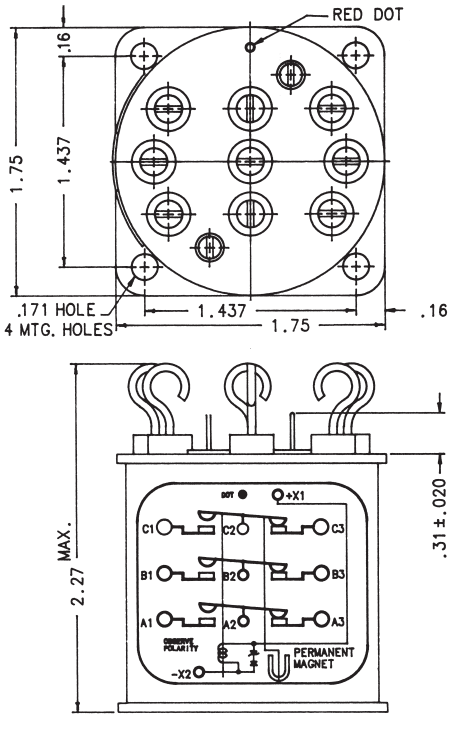


C — Continuous with Suppression

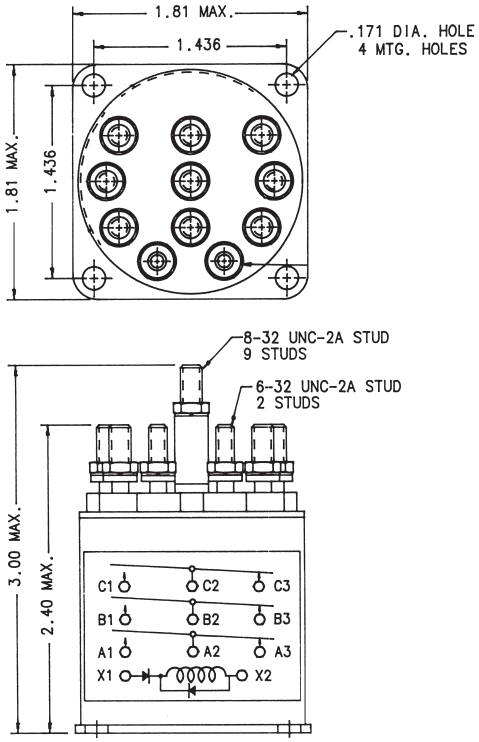
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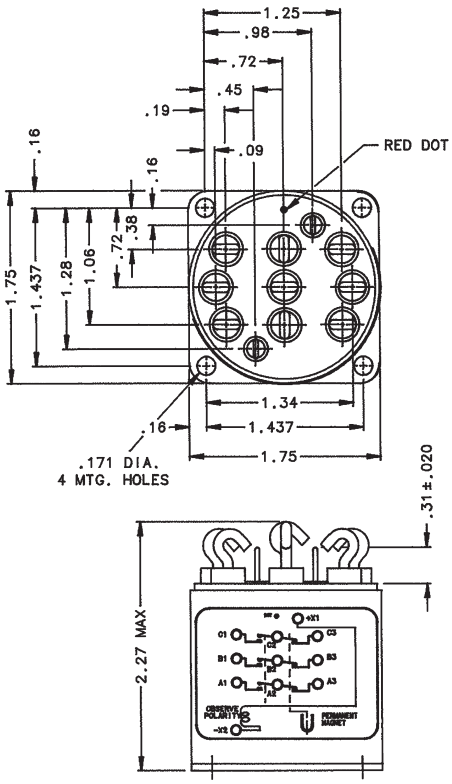
DH-14 and DHR-14 Series Contactors, Rated up to 25 Amps, 115/200 VAC, 400 Hz (Continued)



Mounting Style A



Mounting Style B



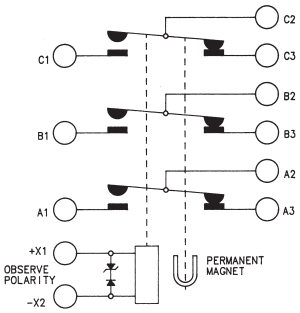
Mounting Style C

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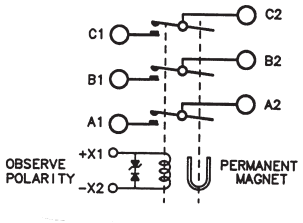
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DH-14 and DHR-14 Series Contactors, Rated up to 25 Amps, 115/200 VAC, 400 Hz (Continued)

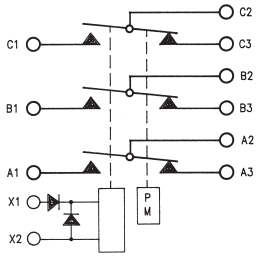
Circuit Configurations (Consult factory for other available circuit configurations)



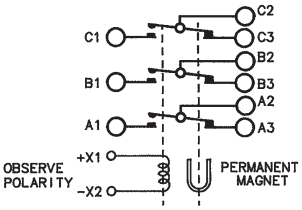
Circuit Configuration 1



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

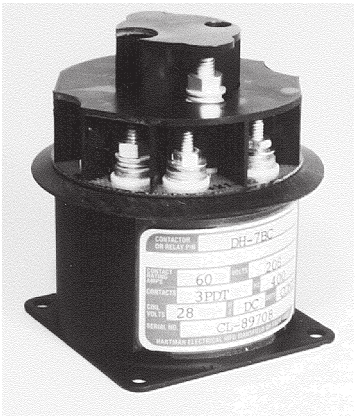
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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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

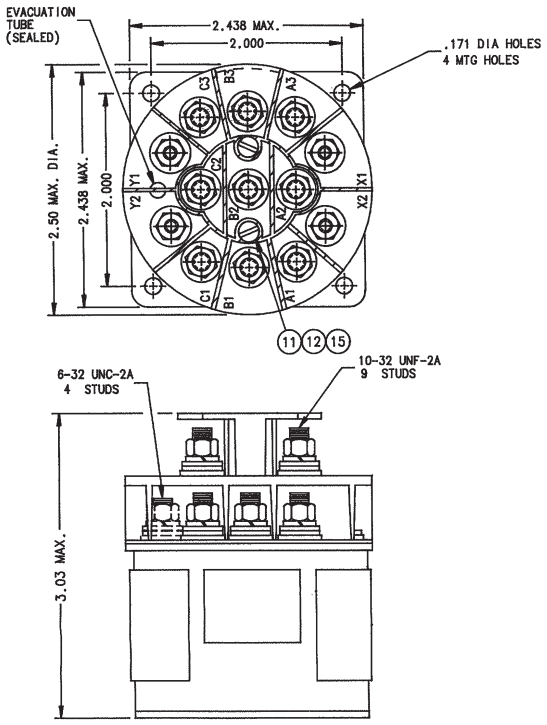
Duty Cycle — Continuous

Coil Rating — 115 VAC, 400 Hz

Pickup Voltage, Max. — 90 Vdc, Hot

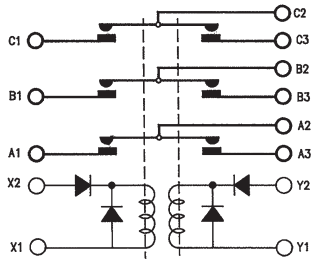
Dropout Voltage — 45 ± 20 Vdc

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



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
DHR-18-1	Hermetically Sealed	A	Continuous	1	1616050-9

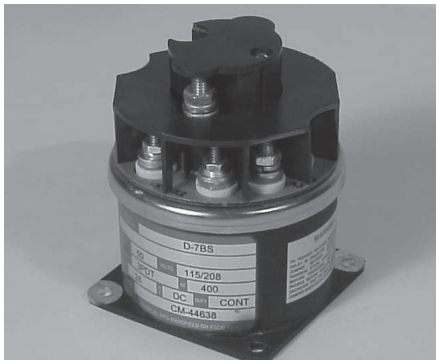
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D7, DH7, DHR7, DR7 Series, Rated up to 50 Amps, 115/200 VAC, 400 Hz

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

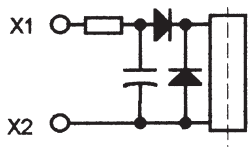
Pickup Voltage @ 25°C, Max. —
VAC 400 Hz — 75 VAC
Vdc — 18 Vdc

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

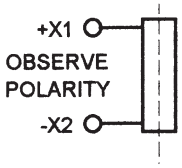
Coil Resistance ±20% @ 25°C —
VAC 400 Hz — 505 Ohms
Vdc — 126 Ohms

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

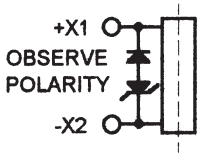
Coil Type



A — AC Continuous



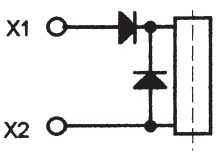
B — Continuous



C — Continuous with Suppression



D — Continuous with Suppression

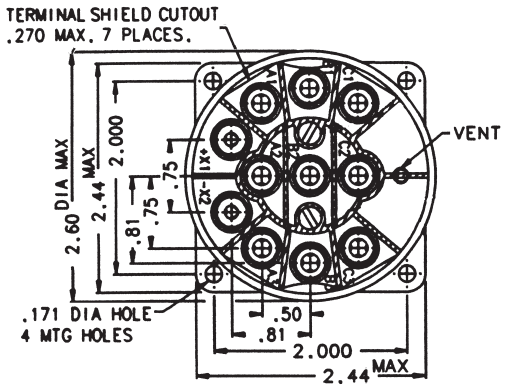


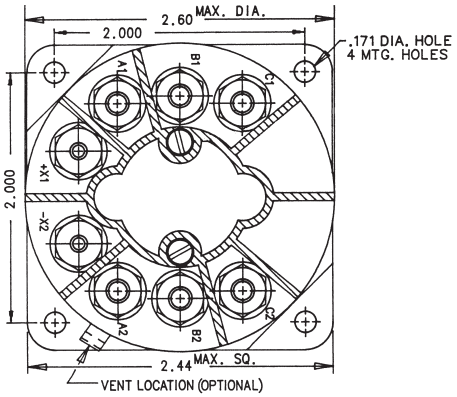
E — AC Continuous

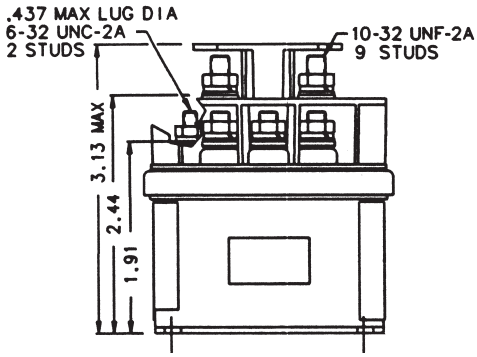
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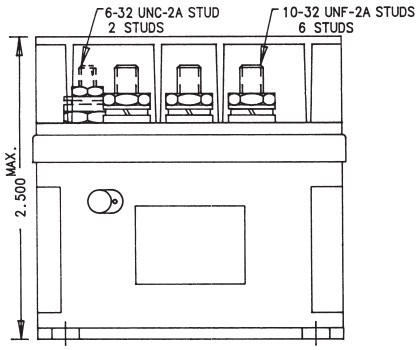
D7, DH7, DHR7, DR7 Series, Rated up to 50 Amps, 115/200 VAC, 400 Hz (Continued)



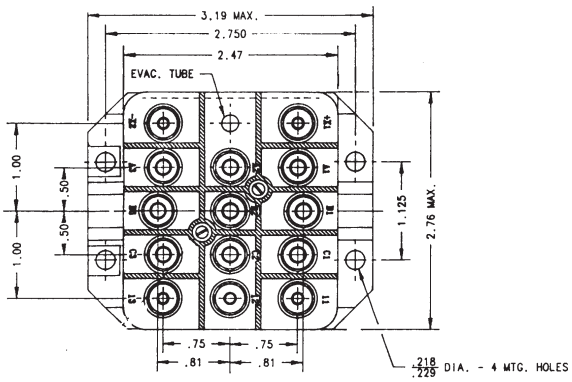


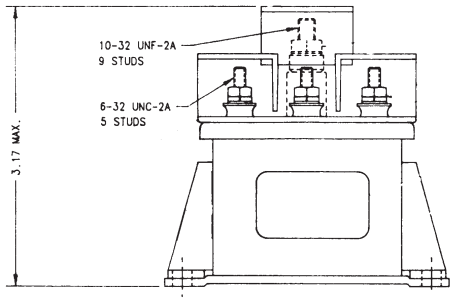


Mounting Style A

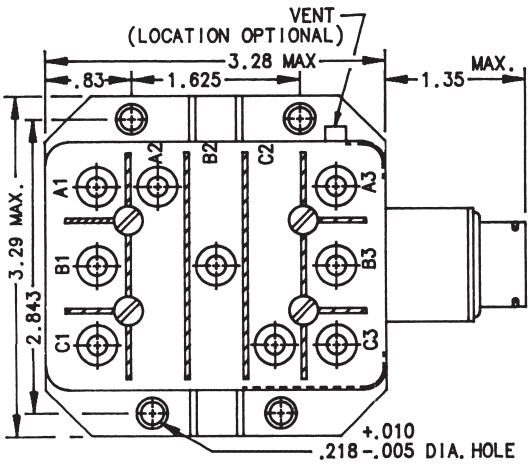


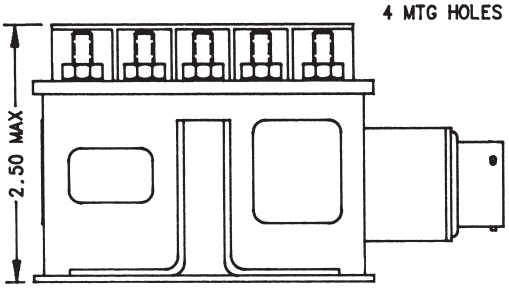
Mounting Style B





Mounting Style C



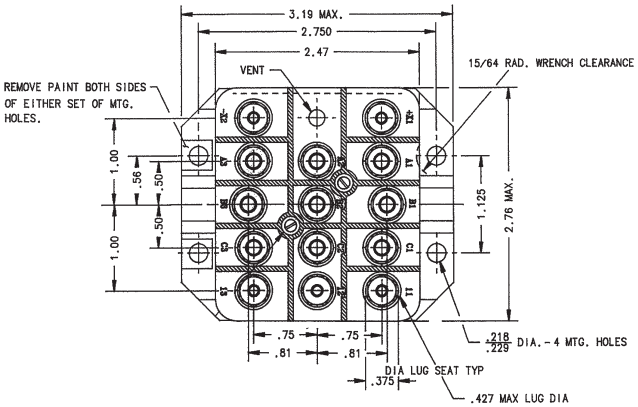


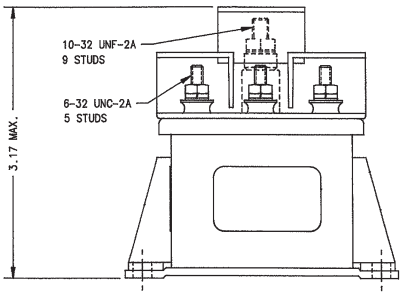
Mounting Style D

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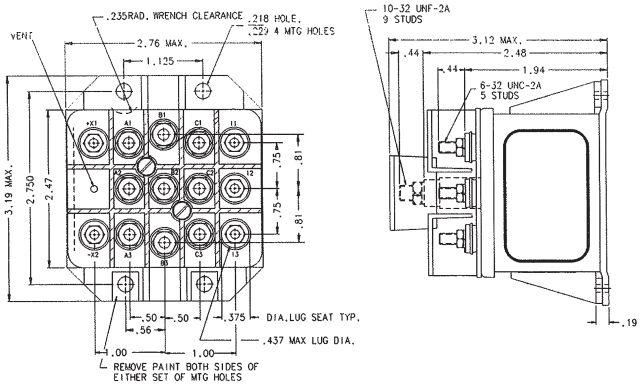
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D7, DH7, DHR7, DR7 Series, Rated up to 50 Amps, 115/200 VAC, 400 Hz (Continued)

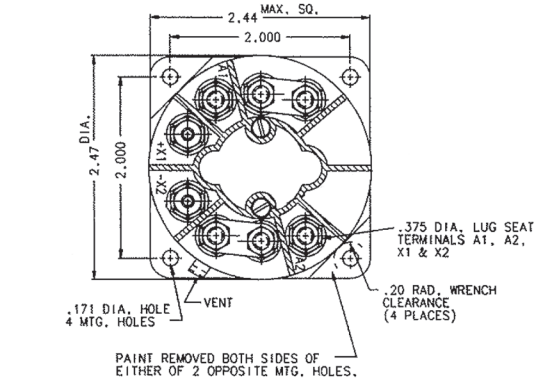


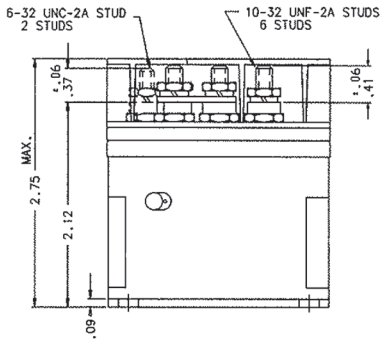


Mounting Style E

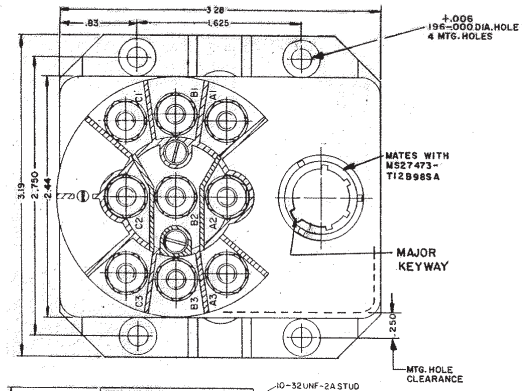


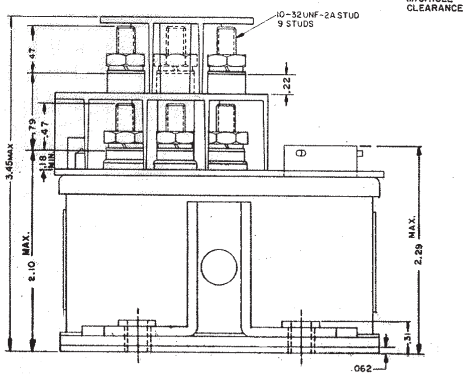
Mounting Style F





Mounting Style G



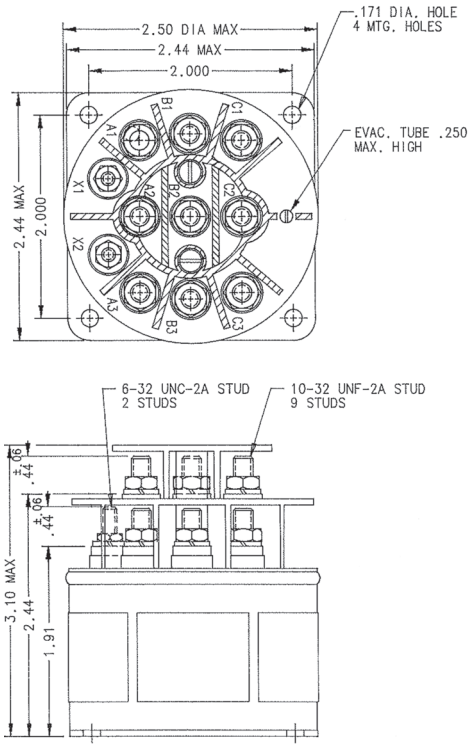


Mounting Style H

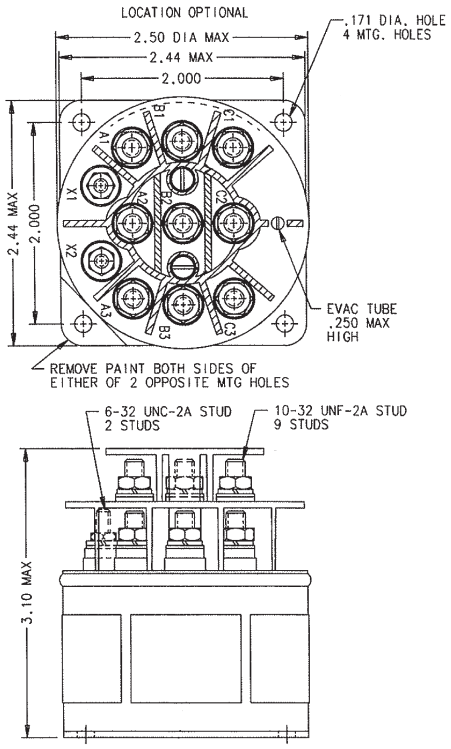
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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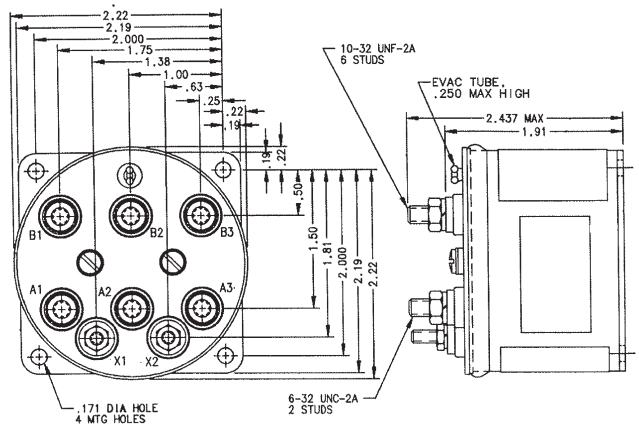
D7, DH7, DHR7, DR7 Series, Rated up to 50 Amps, 115/200 VAC, 400 Hz (Continued)



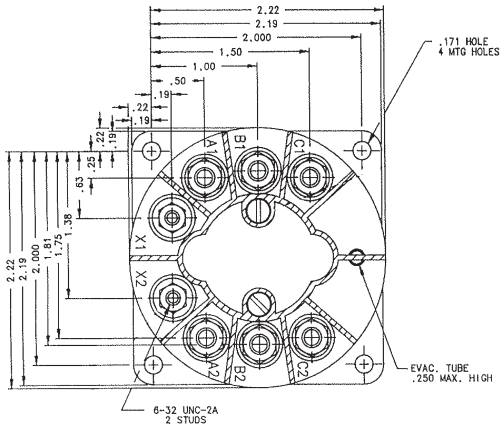
Mounting Style I

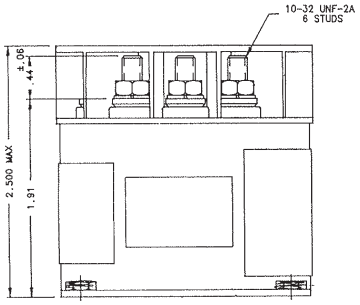


Mounting Style J



Mounting Style K





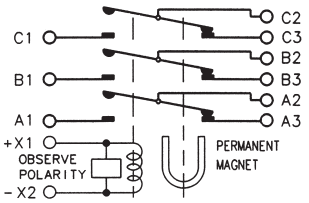
Mounting Style L

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

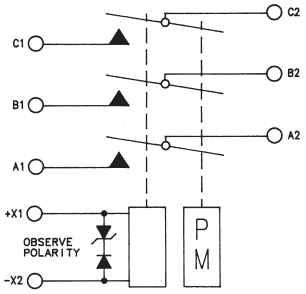
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D7, DH7, DHR7, DR7 Series, Rated up to 50 Amps, 115/200 VAC, 400 Hz (Continued)

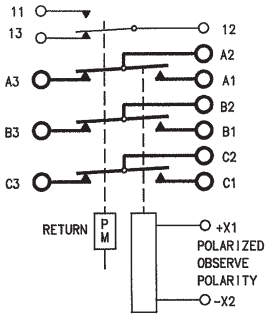
Circuit Configurations (Consult factory for other available circuit configurations)



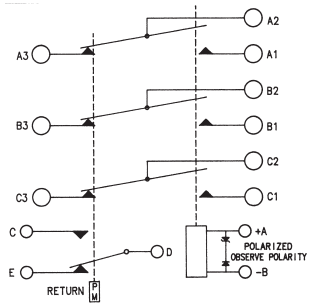
Circuit Configuration 1



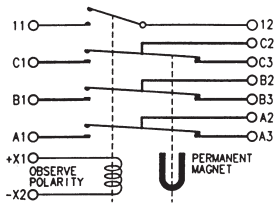
Circuit Configuration 2



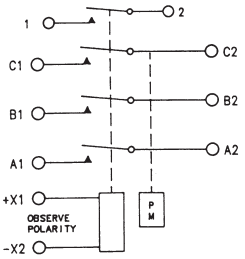
Circuit Configuration 3



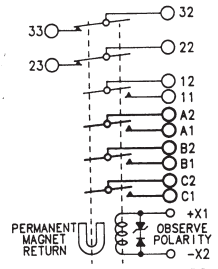
Circuit Configuration 4



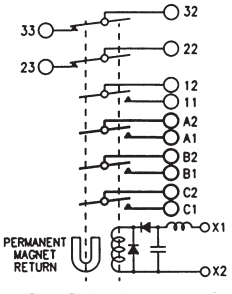
Circuit Configuration 5



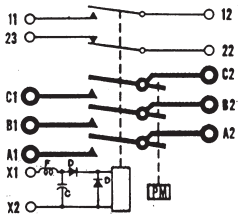
Circuit Configuration 6



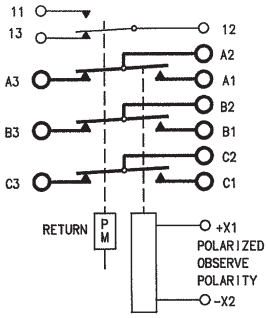
Circuit Configuration 7



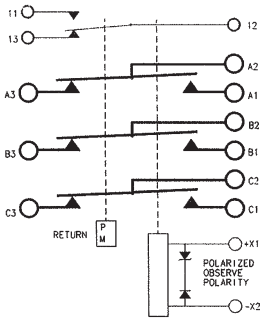
Circuit Configuration 8



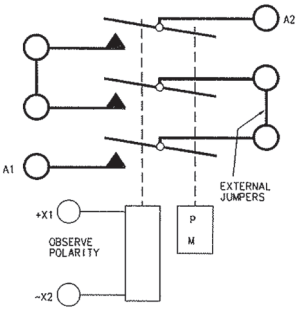
Circuit Configuration 9



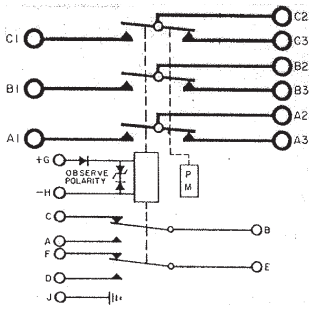
Circuit Configuration 10



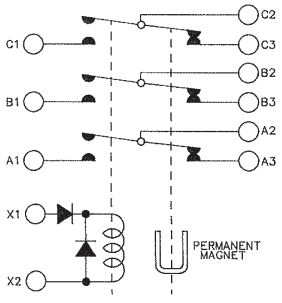
Circuit Configuration 11



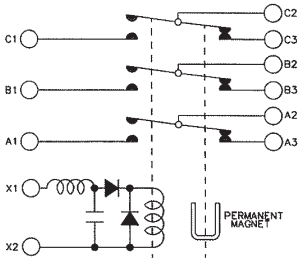
Circuit Configuration 12



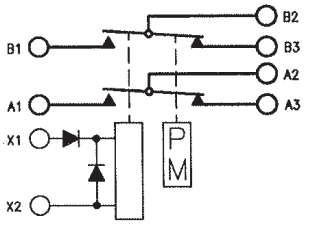
Circuit Configuration 13



Circuit Configuration 14



Circuit Configuration 15

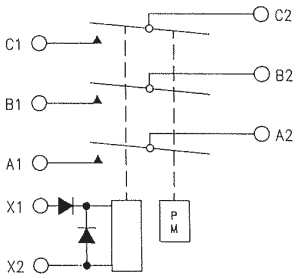


Circuit Configuration 16

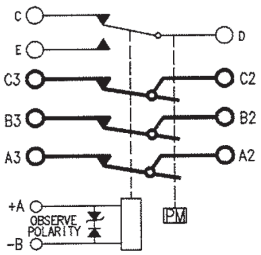
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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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.

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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

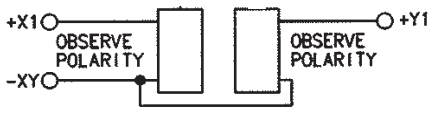
Pickup Voltage @ 25°C, Max. — Coil Type A — 18 Vdc
Coil Type B — 15 Vdc

Dropout Voltage @ 25°C, Max. — Coil Type A — 1.5 to 7 Vdc
Coil Type B — 2.5 to 6.5 Vdc

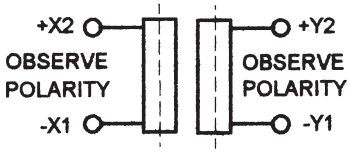
Coil Resistance ±20% @ 25°C — 175 Ohms

Coil Current @ 25°C, Max. — .175 Amp

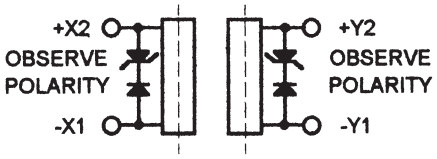
Coil Type



A — DC Continuous



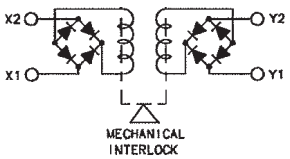
B — DC Continuous



C – DC Continuous with Suppression



D — DC Continuous - Economical w/Suppression

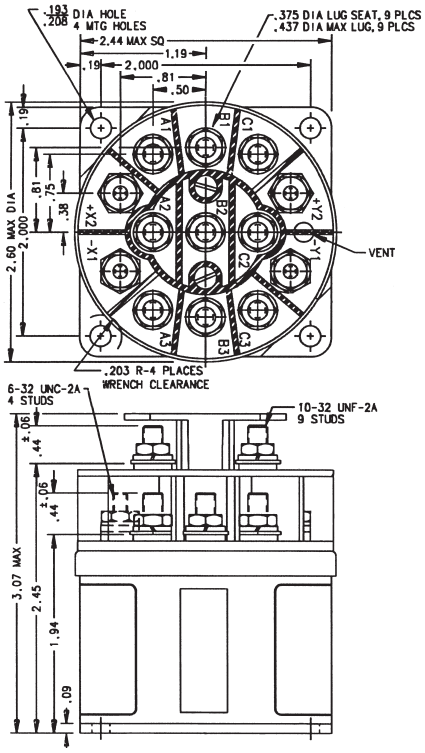


E – AC Continuous

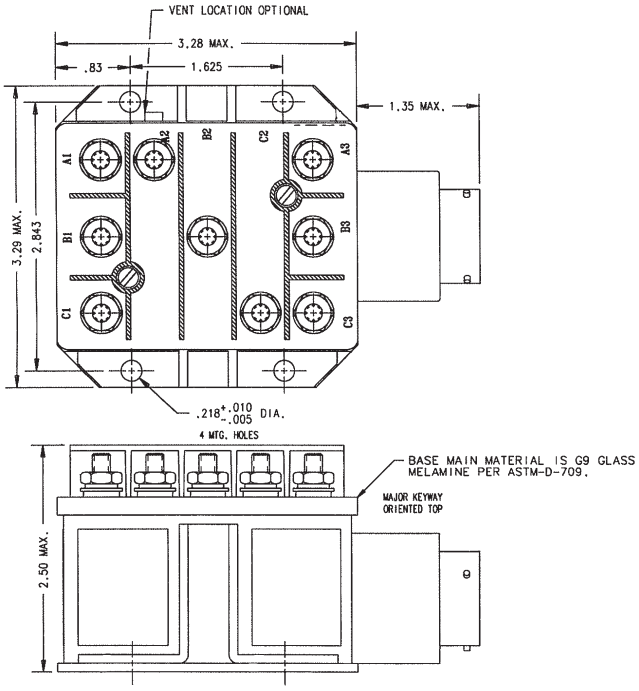
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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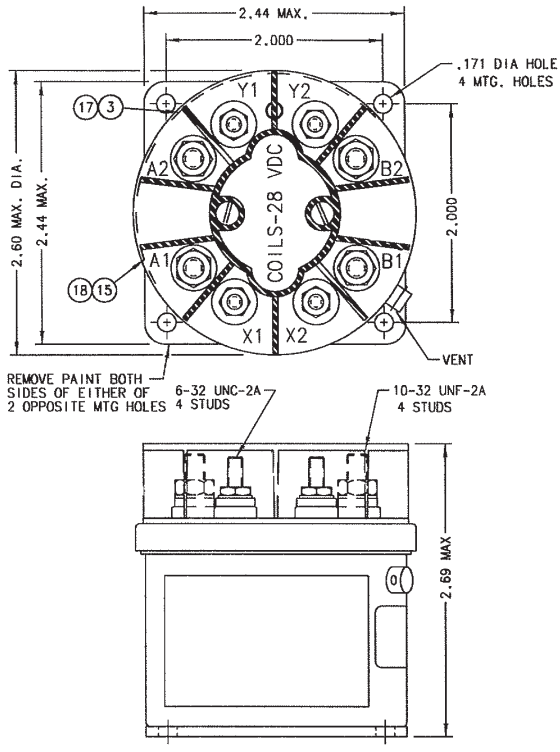
D18, DH18 and DHR18 Series Contactors, Rated up to 50 Amps, 115/200 VAC, 400 Hz (Continued)



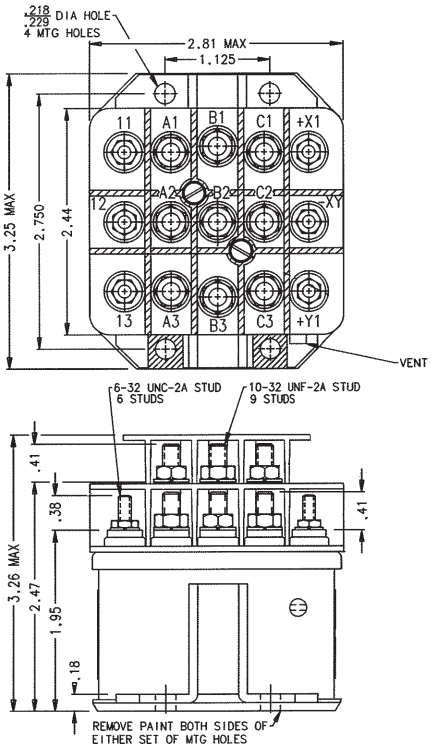
Mounting Style A



Mounting Style B



Mounting Style C



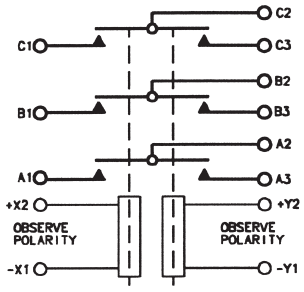
Mounting Style D

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

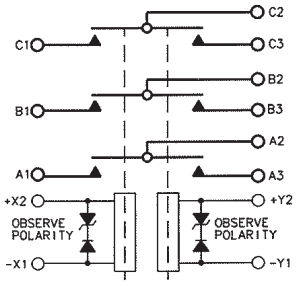
Downloaded from Arrow.com.

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

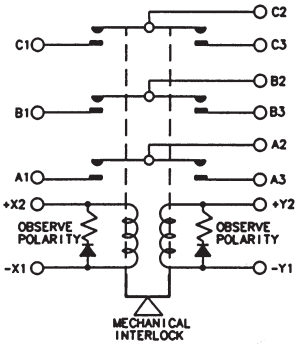
Circuit Configurations (Consult factory for other available circuit configurations)



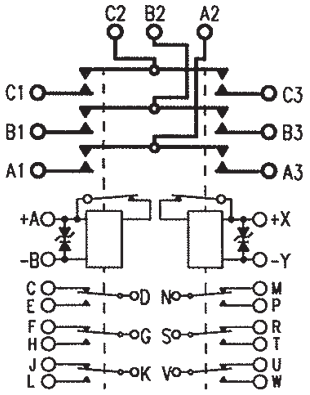
Circuit Configuration 1



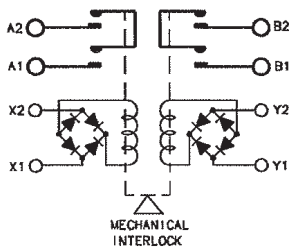
Circuit Configuration 2



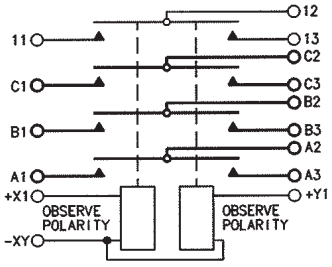
Circuit Configuration 3



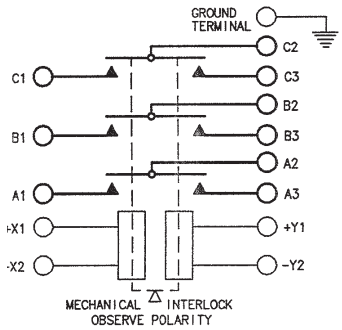
Circuit Configuration 4



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.

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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

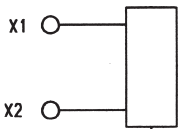
Operating Voltage, Nom. — 28 Vdc

Pickup Voltage, Max. — 18 Vdc

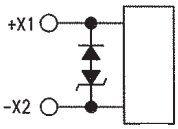
Dropout Voltage — 1.5 to 7 Vdc

Coil Current, Holding, Max. — 0.5 Amp

Coil Type



A — Continuous

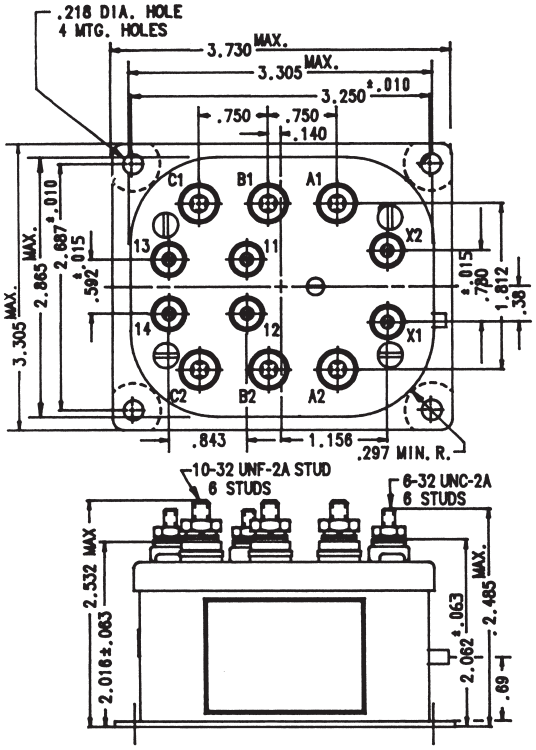


B — Continuous w/Suppression

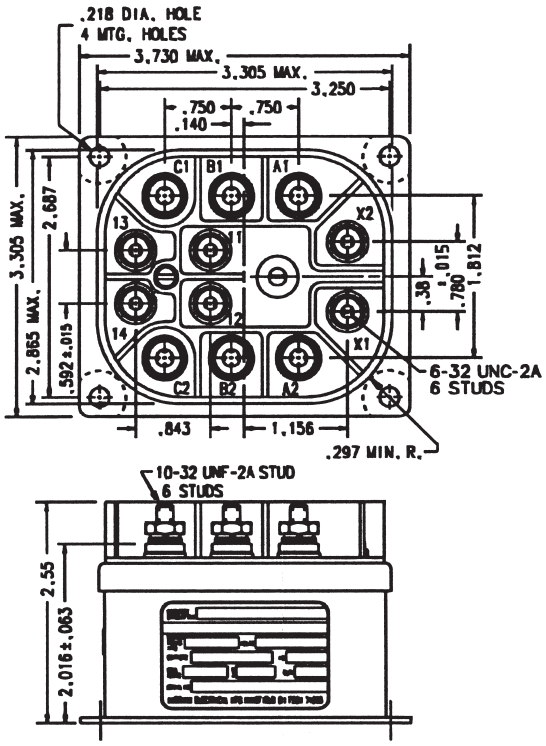
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

Downloaded from Arrow.com.

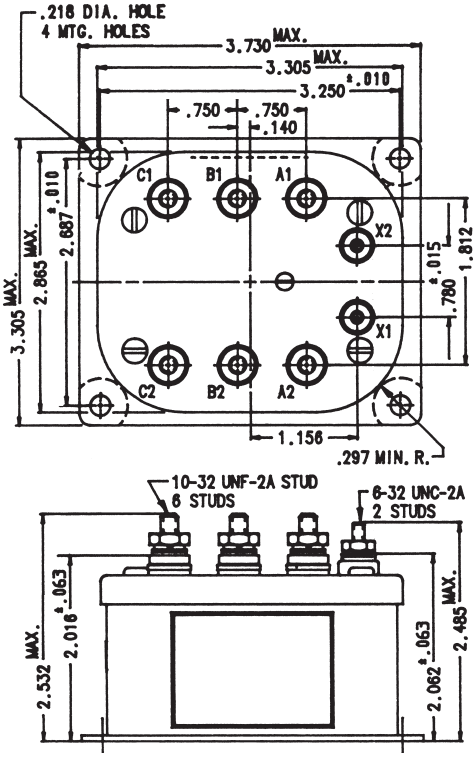
BH-316 Series, Rated up to 50 Amps, 115/200 VAC, 400 Hz or 28 Vdc (Continued)



Mounting Style A



Mounting Style B



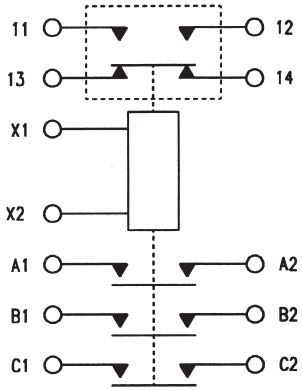
Mounting Style C

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

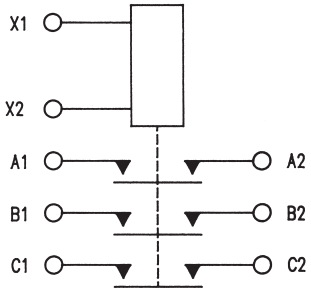
Downloaded from Arrow.com.

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

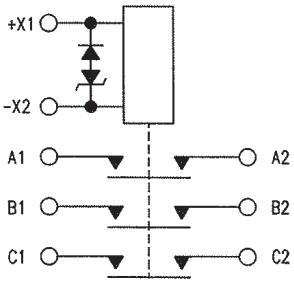
Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 2



Circuit Configuration 3

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

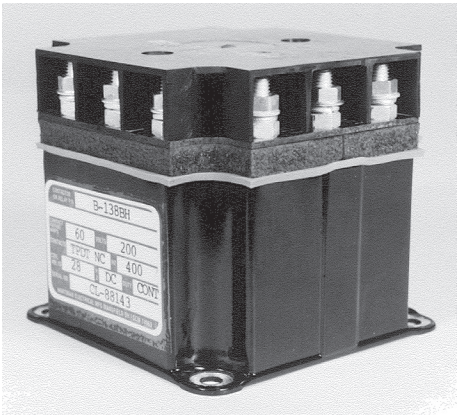
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

Downloaded from Arrow.com.

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

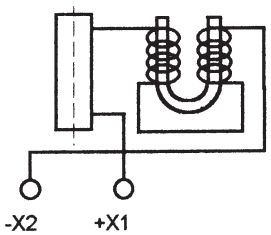
Pickup Voltage, Max. @ 85°C — 18 Vdc

Dropout Voltage, Max. — 1.5 to 7 Vdc

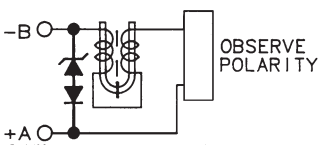
Coil Current @ 29 Vdc Max. @ 25°C — 0.5 Amps

Inrush — 5 Amps

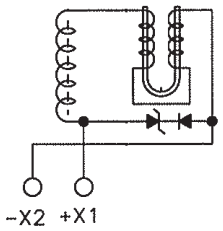
Coil Type



A — Continuous



B — Continuous with Suppression

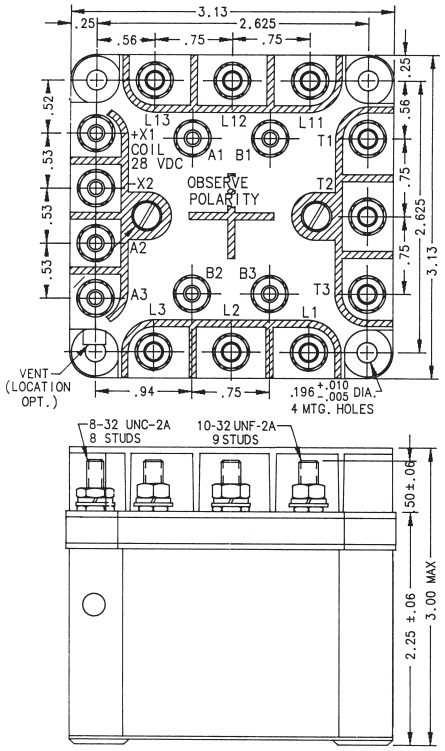


C — Continuous with Suppression

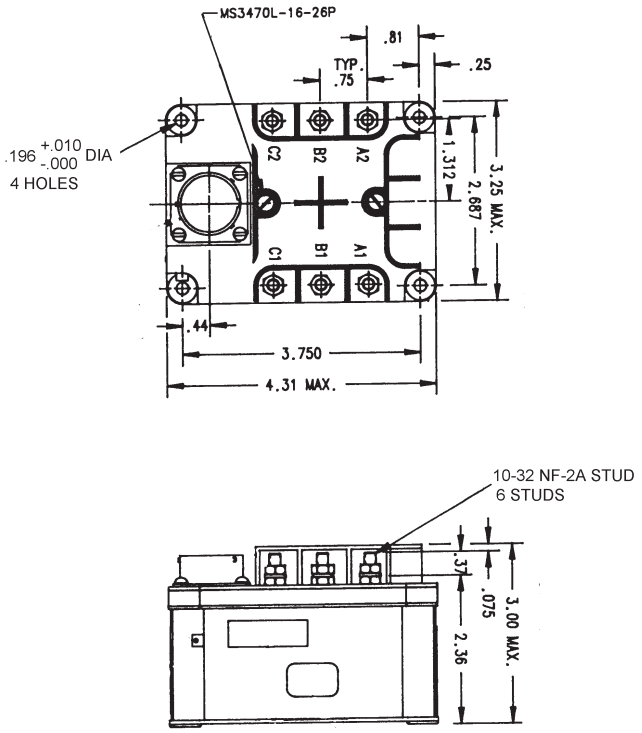
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

Downloaded from Arrow.com.

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

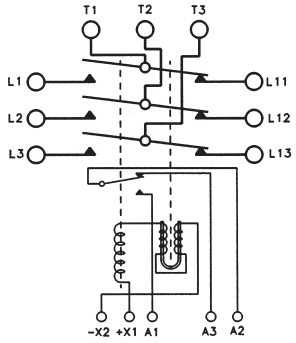


Mounting Style A

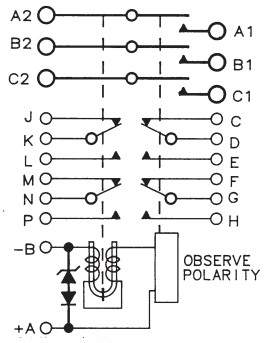


Mounting Style B

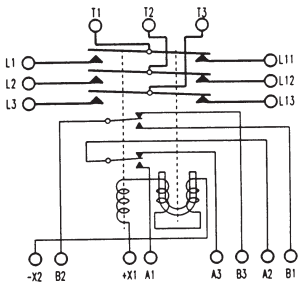
Circuit Configurations (Consult factory for other available circuit configurations)



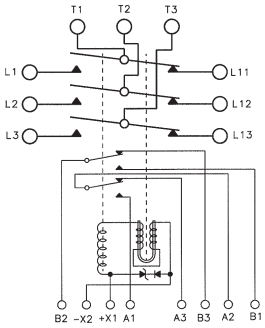
Circuit Configuration 1



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

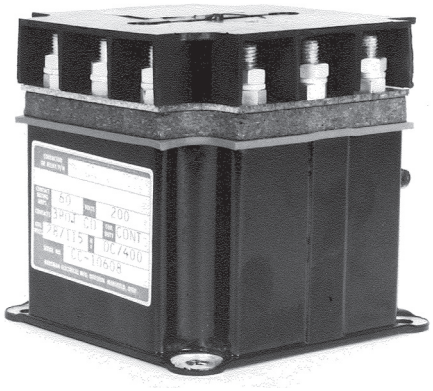
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

Downloaded from Arrow.com.

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

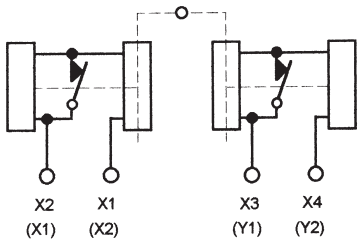
Pickup Voltage, Max. @ 85°C — 18 Vdc

Dropout Voltage, Max. — 1.5 to 7 Vdc

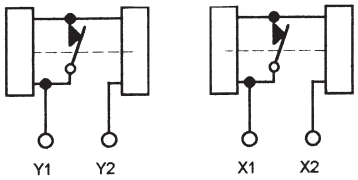
Coil Current @ 29 Vdc Max. @ 25°C — 0.35 Amps

Inrush — 5 Amps

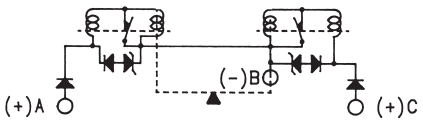
Coil Type



A — Continuous



B — Continuous

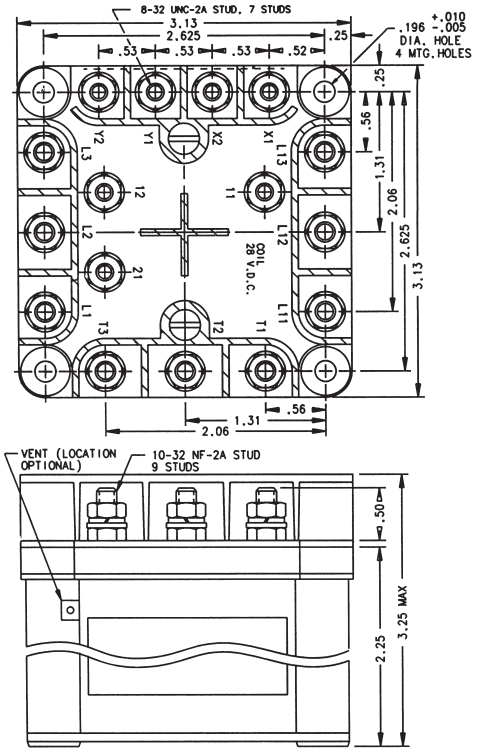


C — Continuous w/Suppression

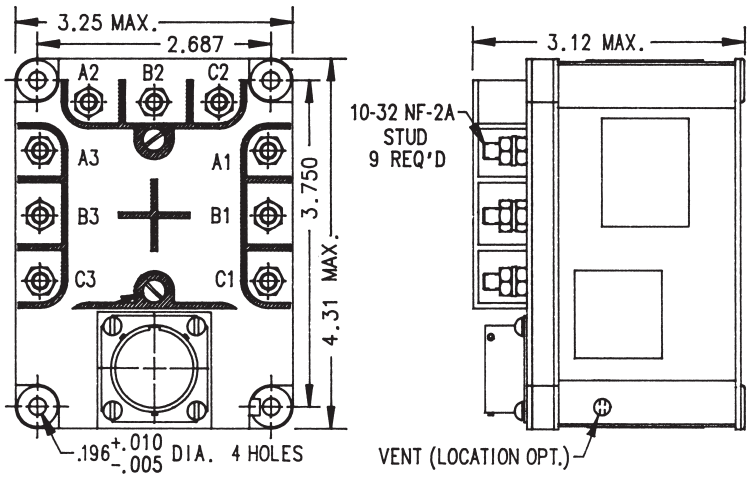
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

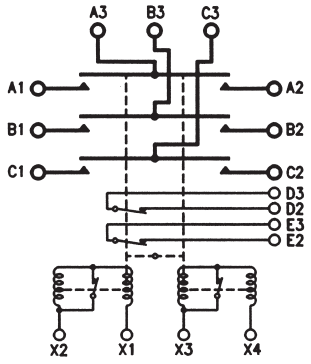


Mounting Style A

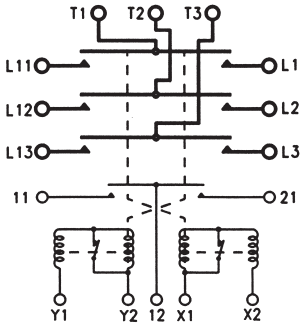


Mounting Style B

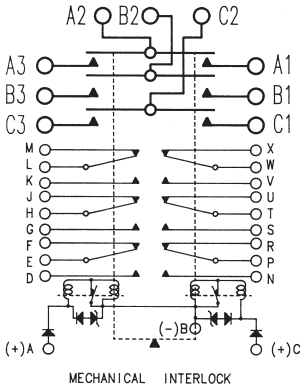
Circuit Configurations (Consult factory for other available circuit configurations)



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.

Downloaded from Arrow.com.

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

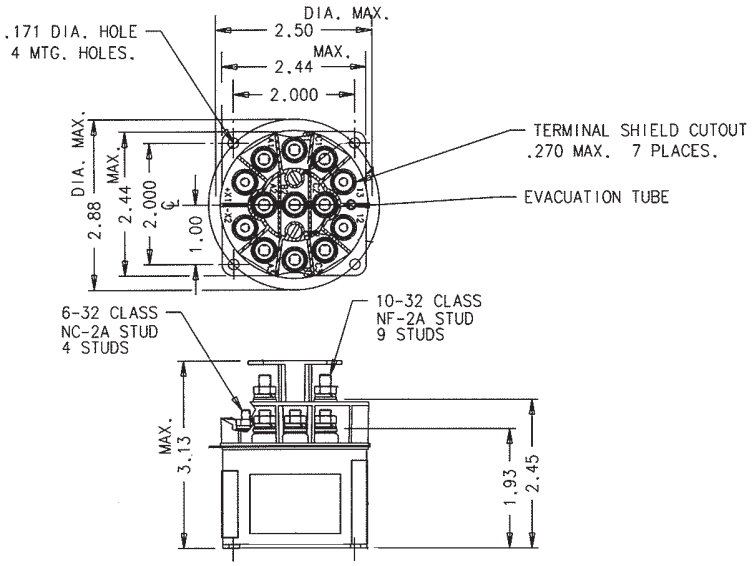
Operating Voltage, Nom. — 28 Vdc

Pickup Voltage @ 25°C, Max. — 18 Vdc

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

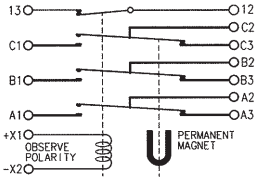
Coil Resistance ±20% @ 25°C — 126 Ohms

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.

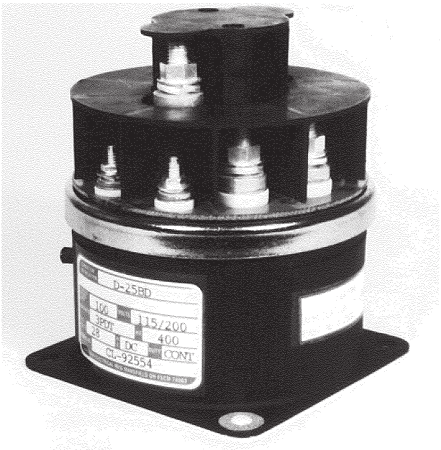
HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
DH-7BC	Hermetically Sealed	A	Continuous	1	1616037-8

Downloaded from Arrow.com.

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)

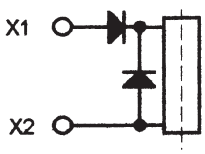
Operating Voltage, Nom. — VAC 400 Hz — 115 VAC
Vdc — 28 Vdc

Pickup Voltage @ 25°C, Max. — VAC 400 Hz — 103.5 VAC
Vdc — 18 Vdc

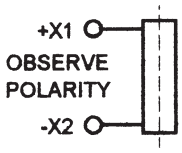
Dropout Voltage @ 25°C, Max. — VAC 400 Hz — 5 to 45 VAC
Vdc — 1.5 to 7 Vdc

Coil Resistance ±20% @ 25°C — VAC 400 Hz — N/A
Vdc — 175 Ohms

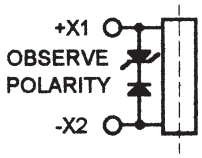
Coil Type



A — AC



B — Continuous

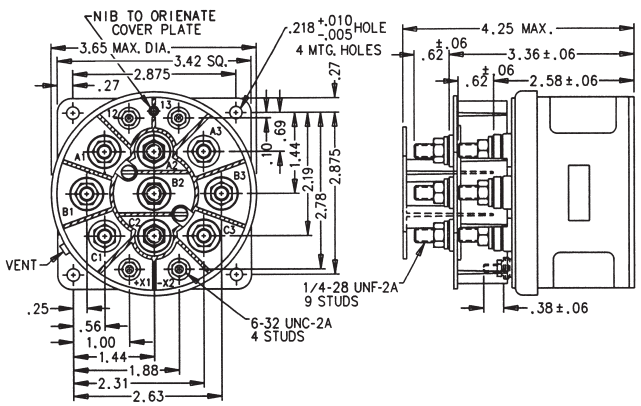


C — Continuous with Suppression

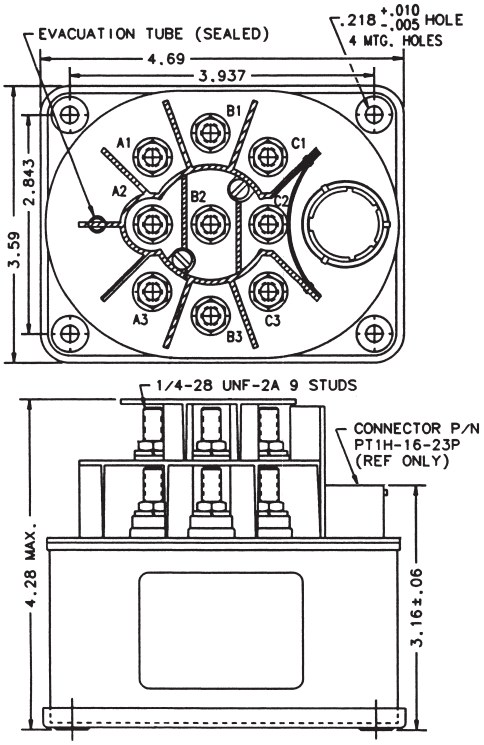
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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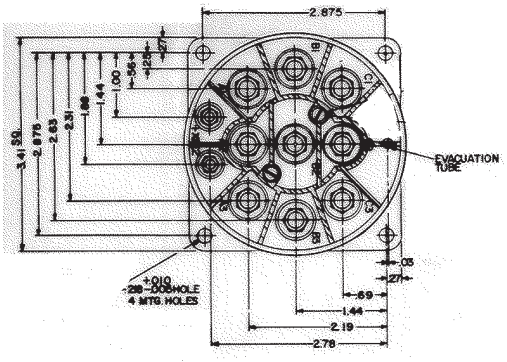
D25, DH25 and DHR25 Series, Rated up to 100 Amps, 115/200 VAC, 400 Hz (Continued)

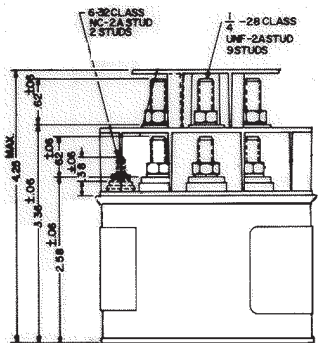


Mounting Style A



Mounting Style B





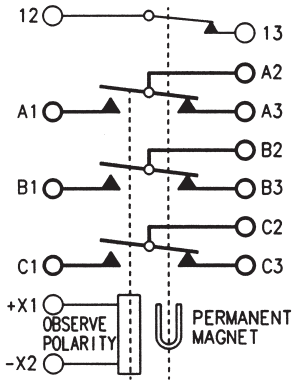
Mounting Style C

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

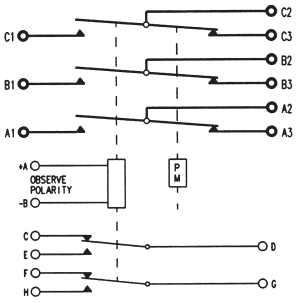
Downloaded from Arrow.com.

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

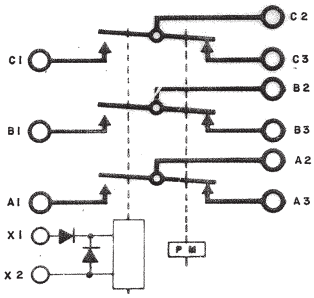
Circuit Configurations (Consult factory for other available circuit configurations)



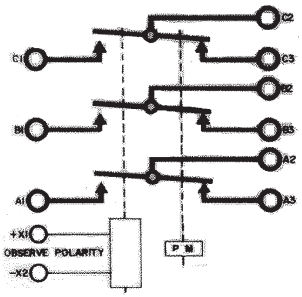
Circuit Configuration 1



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.

Downloaded from Arrow.com.

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)

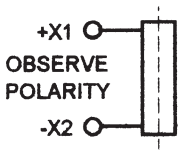
Operating Voltage, Nom. — 28 Vdc

Pickup Voltage @ 25°C, Max. — 18 Vdc

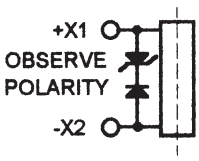
Dropout Voltage @ 25°C, Max. — 1.5 to 7 Vdc

Coil Resistance ±20% @ 25°C — 113 Ohms

Coil Type



A — Continuous

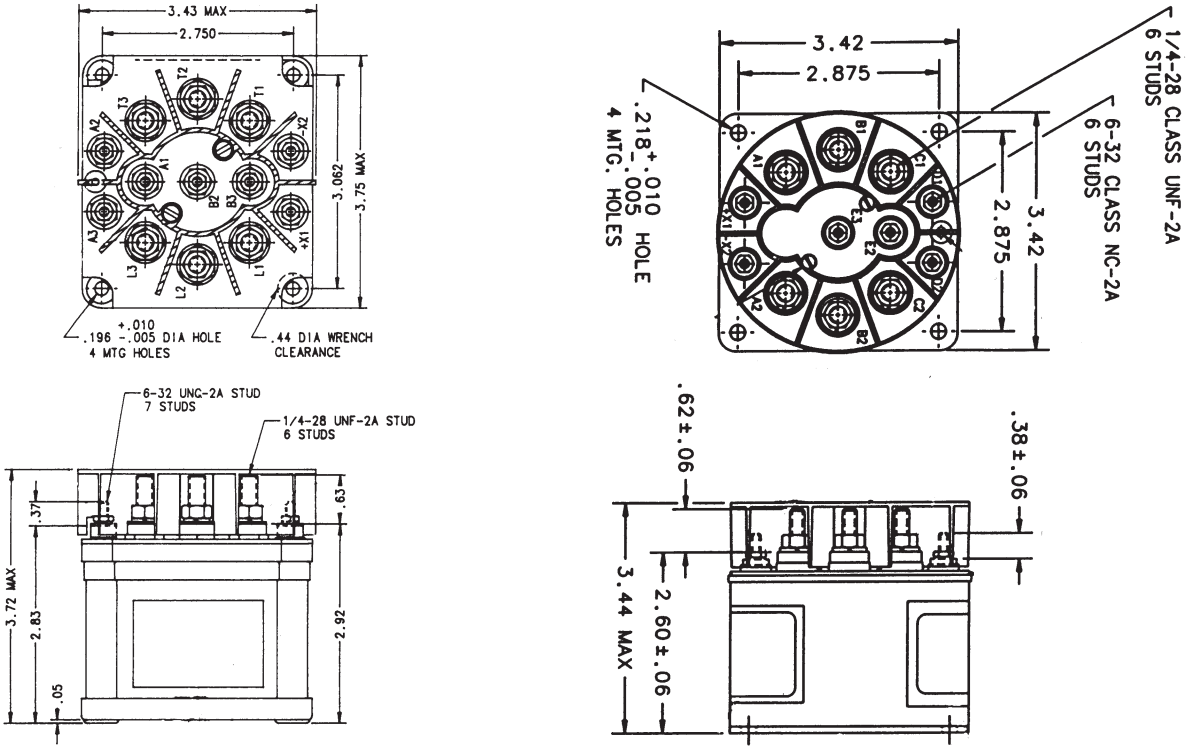


B — Continuous with Suppression

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

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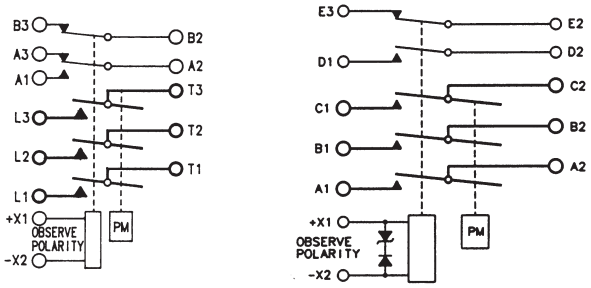
D25 and DH25 Series, Rated up to 120 Amps, 115/200 VAC, 400 Hz (Continued)



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

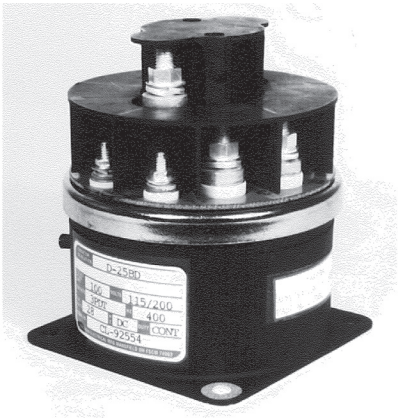
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

Downloaded from Arrow.com.

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

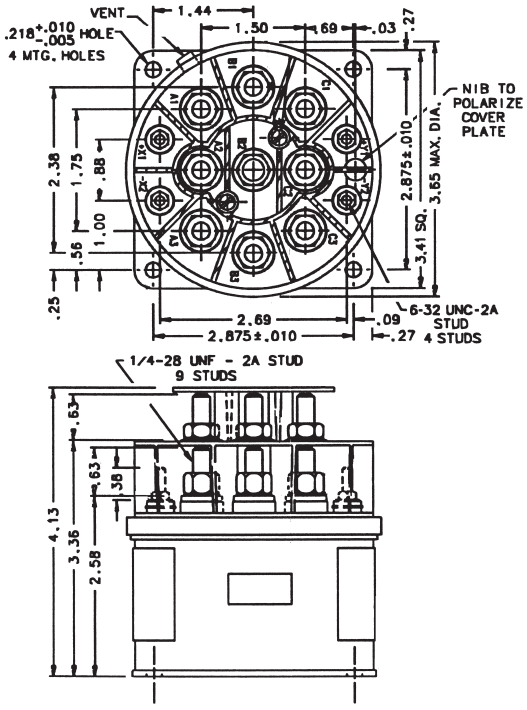
Duty Cycle — Continuous

Operating Voltage, Nom. — 28 Vdc

Pickup Voltage @ 71°C, Max. — 18 Vdc

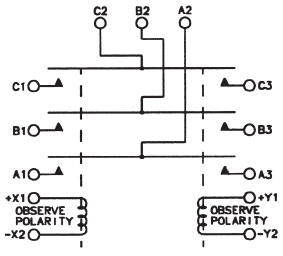
Dropout Voltage, Max. — 1.5 to 7 Vdc

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



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

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

Downloaded from Arrow.com.

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

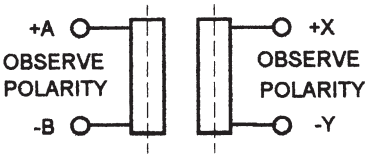
Pickup Voltage @ 25°C, Max. — Coil Type A and C — 18 Vdc
Coil Type B — 15 Vdc

Dropout Voltage @ 25°C, Max. — Coil Type A and C — 1.5 to 7 Vdc
Coil Type B — 2 to 7 Vdc

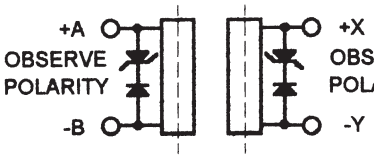
Coil Resistance ±20% @ 25°C — Coil Type A — N/A
Coil Type B — 100 Ohms
Coil Type C — 132 Ohms

Coil Current @ 25°C, Max. — .350 Amp

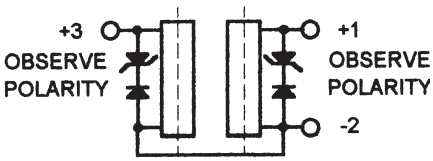
Coil Type



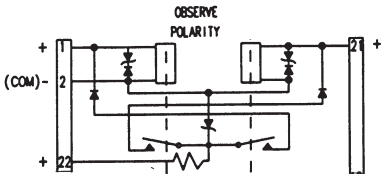
A — Continuous



B — Continuous with Suppression



C — Continuous with Suppression

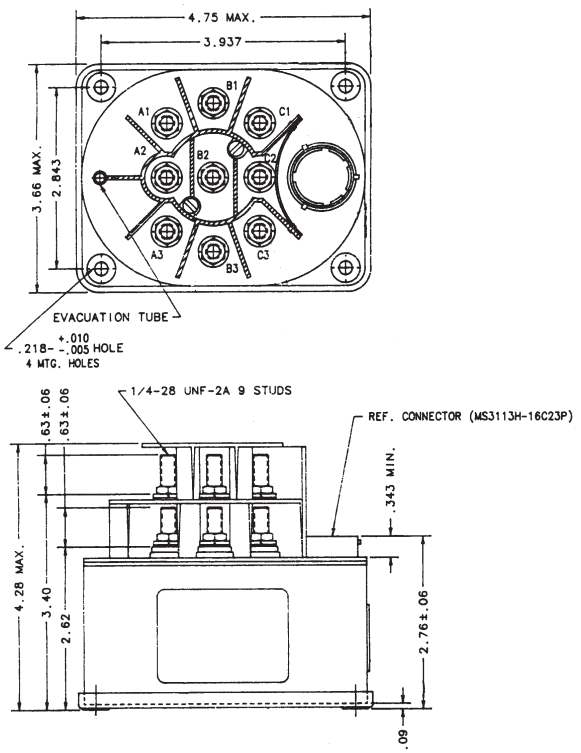


D — Latching

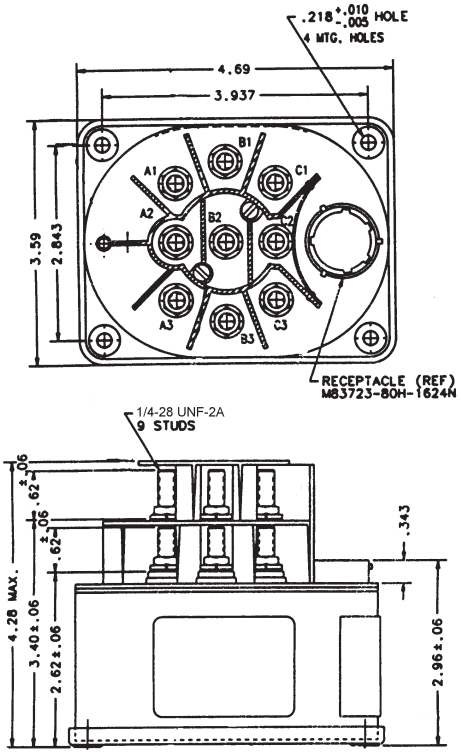
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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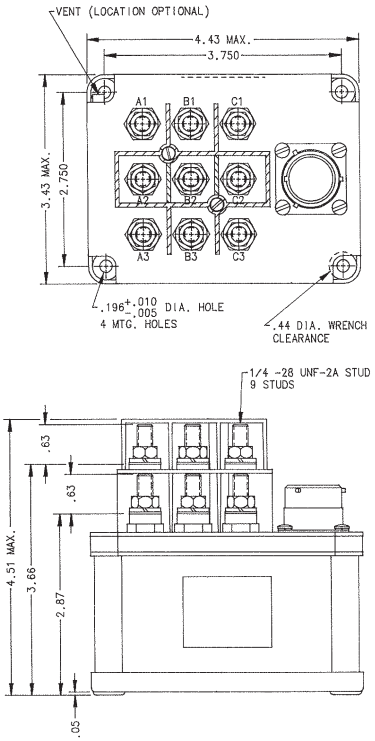
D-31, DH-31, and DHL-31 Series, Rated up to 120 Amps, 115/200 VAC, 400 Hz (Continued)



Mounting Style A



Mounting Style B



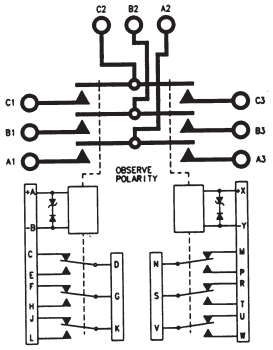
Mounting Style C

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

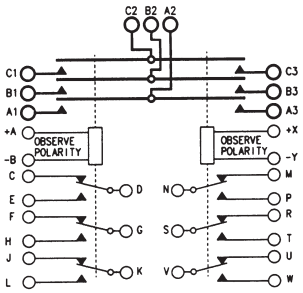
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D-31, DH-31, and DHL-31 Series, Rated up to 120 Amps, 115/200 VAC, 400 Hz (Continued)

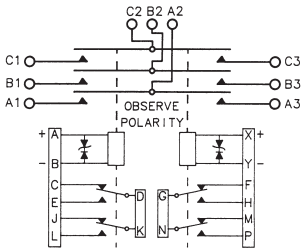
Circuit Configurations (Consult factory for other available circuit configurations)



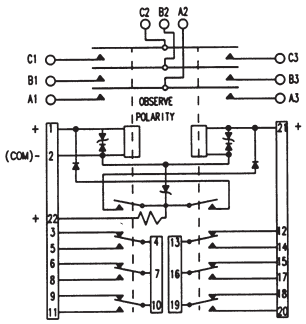
Circuit Configuration 1



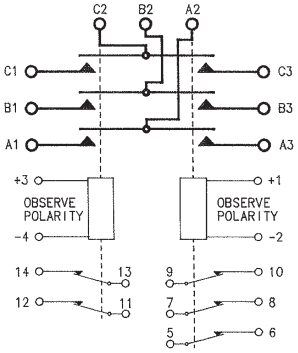
Circuit Configuration 2



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.

Downloaded from Arrow.com.

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

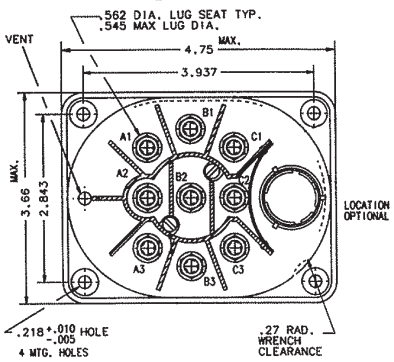
Duty Cycle — Continuous

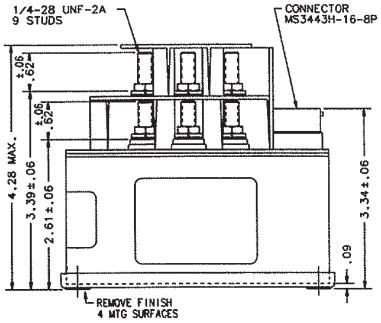
Operating Voltage, Nom. — 28 Vdc

Pickup Voltage @ 25°C, Max. — 18 Vdc

Dropout Voltage @ 25°C — 2.5 to 7 Vdc

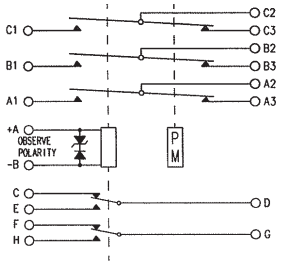
Coil Resistance @ 25°C — 113 Ohms ± 20%





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

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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 Currant 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

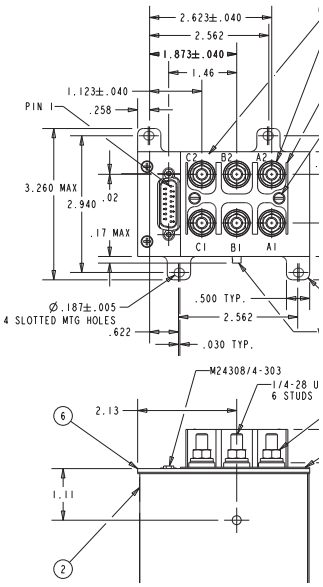
Altitude — 50,000 ft

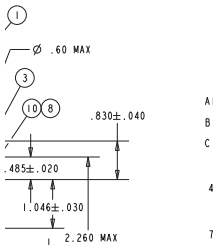
Weight, Max. — 1.35 lbs

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.**

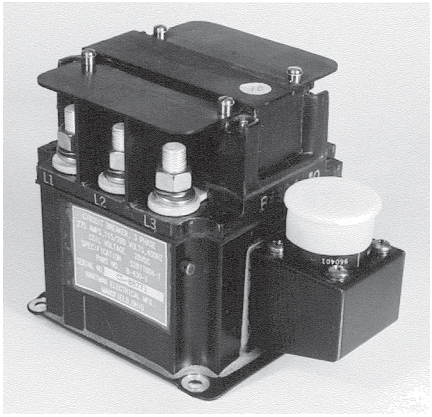
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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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

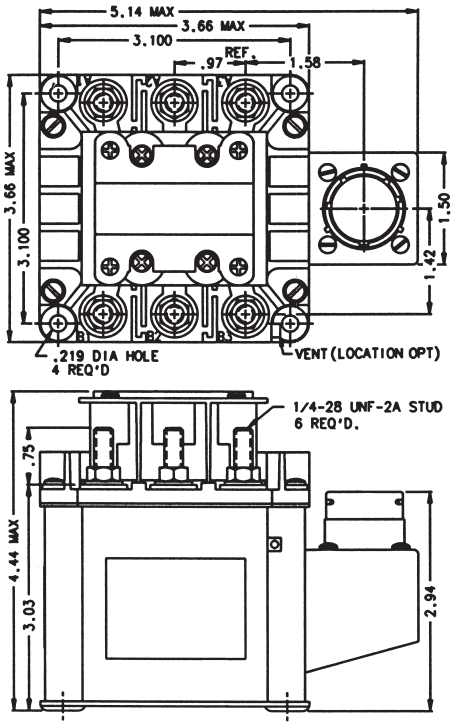
Coil Characteristics

Duty Cycle — Continuous, self-deenergizing

Operating Voltage, Max. — 30 Vdc

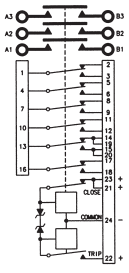
Close Voltage @ 15 to 30 Vdc —
Resistance — 4.4 +10% Ohms
Current — 5 Amp Max.

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

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

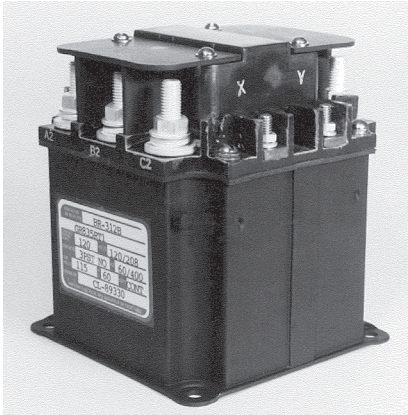
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

Downloaded from Arrow.com.

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

Product Facts

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



Performance Data

Electrical Characteristics

Contact Arrangement — 3PST NO, Double Break

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

Current, Resistive — 175 Amps

Current, Inductive — B312DB — 70 Amps

Current, Motor — 150 Amps

Current, Rupture — 1,500 Amps

General Characteristics

Temperature Range — -55°C to +71°C

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

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

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

Weight, Max. — 3.0 lbs

Coil Characteristics

Duty Cycle — Continuous, economizing

Operating Voltage, Nom. — 28 Vdc

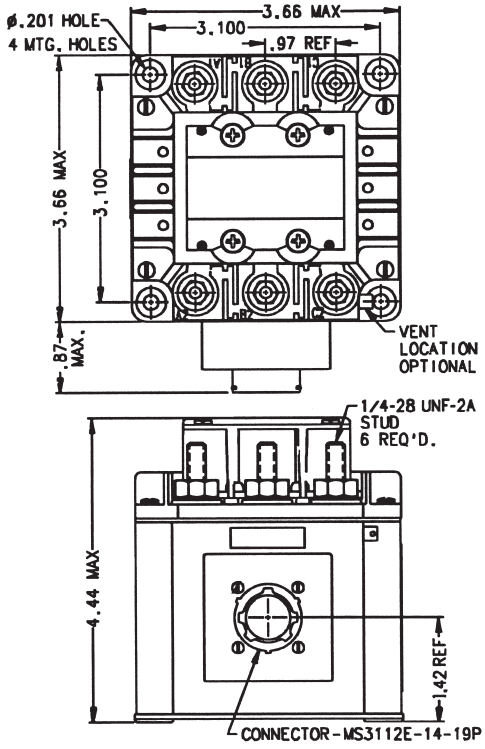
Pickup Voltage — 18 Vdc

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

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

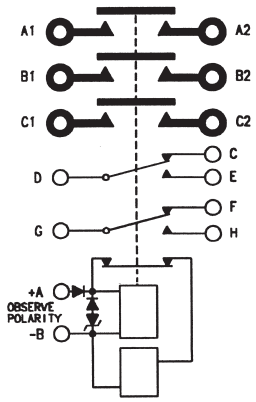
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B-312 Series, Rated up to 175 Amps, 253/440 VAC, 50-60 Hz (Continued)



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.

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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

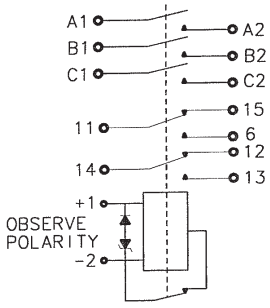
Duty Cycle — Continuous, economizing

Operating Voltage, Nom. — 28 Vdc

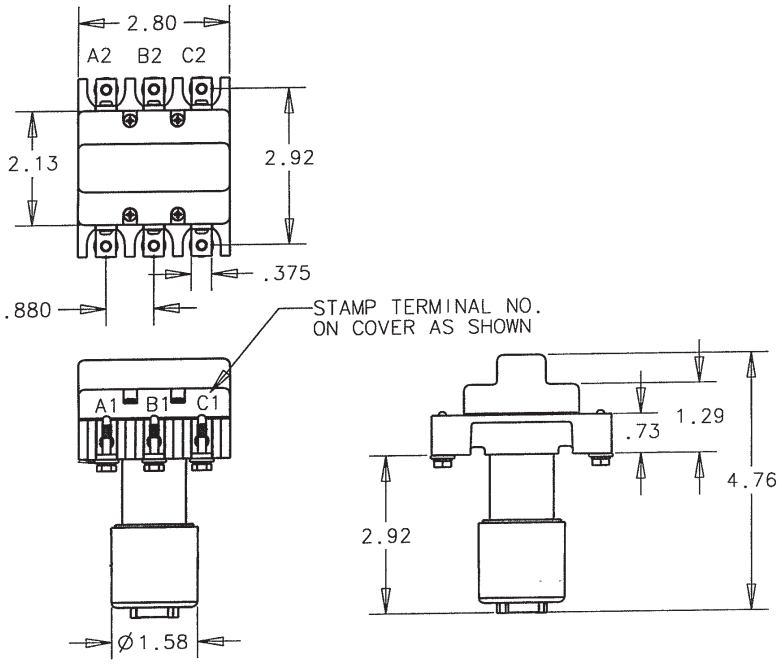
Pickup Voltage — 18 Vdc

Dropout Voltage — 1.0 to 7 Vdc

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1



Mounting Style A

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

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

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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

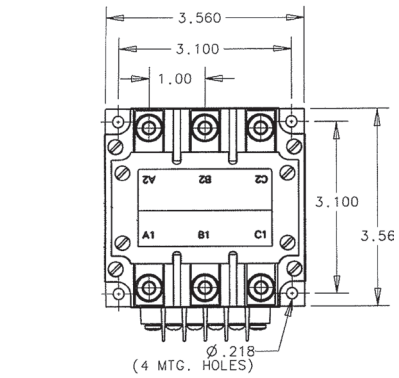
Duty Cycle — Continuous, economizing

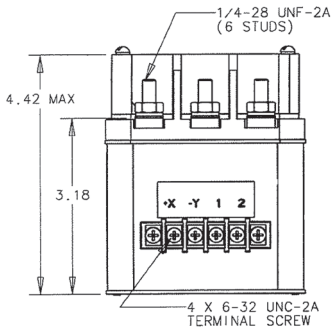
Operating Voltage, Nom. — 24 Vdc

Pickup Voltage, Max. — 18 Vdc

Dropout Voltage — 1 to 10 Vdc

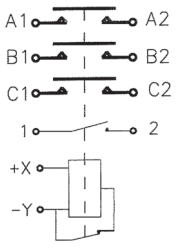
Coil Resistance — 240A
Rupture — 2400A





Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

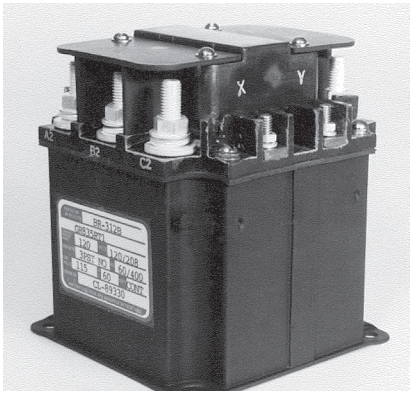
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

Product Facts

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



Performance Data

Electrical Characteristics

Main Contacts —

Contact Arrangement — 3PST NO, Double Break

Rated Operating Voltage — 115 VAC, 400 Hz

Resistive Rating — 200 Amps

Inductive Rating — 200 Amps

Rupture Rating — 2000 Amps

Auxiliary Contacts —

Contact Arrangement — 4PST NC

Voltage, Nom. — 28 Vdc or 115 VAC, 400 Hz

Resistive Rating — 5 Amps

General Characteristics

Temperature Range — -55°C to +71°C

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

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

Weight, Max. — 3 lbs

Coil Characteristics

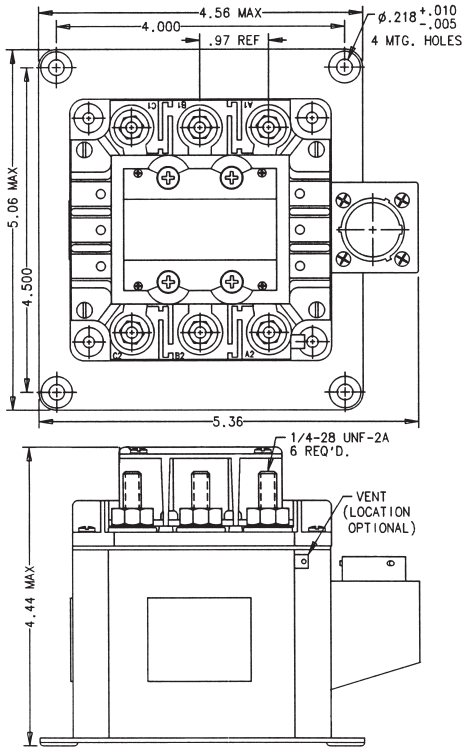
Duty Cycle — Continuous, economizing

Operating Voltage, Nom. — 28 Vdc

Pickup Voltage, Max. — 18 Vdc

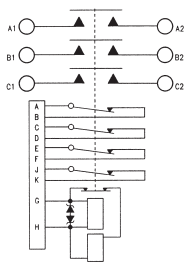
Dropout Voltage — 1 to 7 Vdc

Coil Resistance —
Pickup — 12 Ohms ± 20%
Holding — 60 Ohms ± 20%



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

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

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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

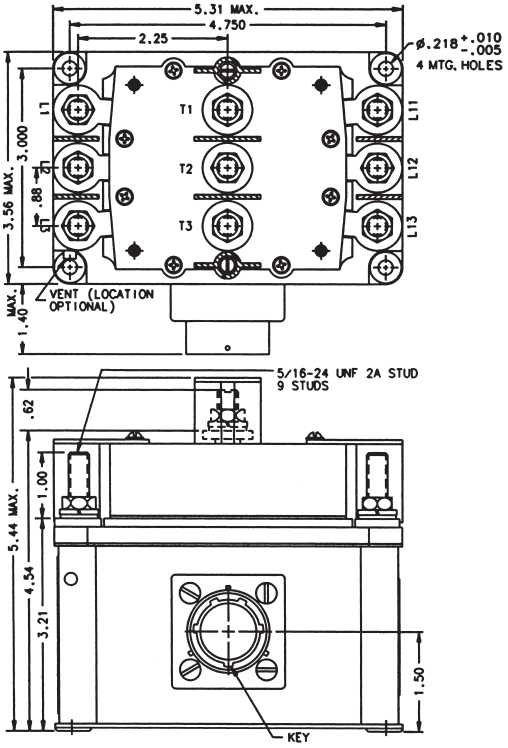
Coil Characteristics

Duty Cycle — Continuous, economizing

Operating Voltage, Nom. — 28 Vdc

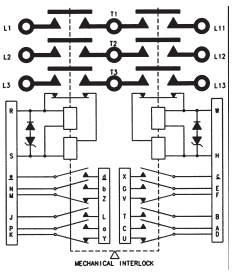
Pickup Voltage, Max. — 18 Vdc

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

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

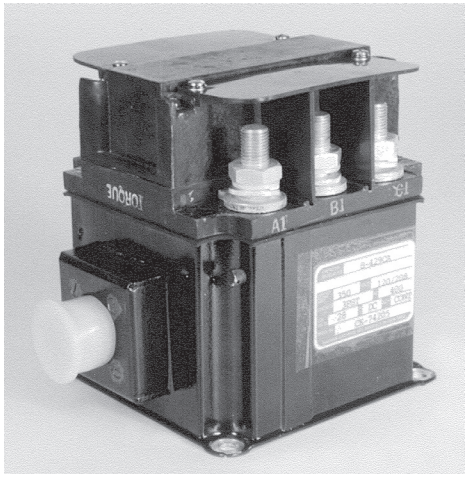
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

Downloaded from Arrow.com.

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

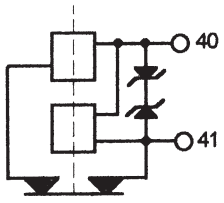
Pickup Voltage, Max. —
Coil Type A — 15 Vdc
Coil Type B — 18 Vdc

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

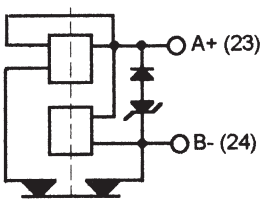
Coil Current Inrush —
Coil Type A — 6 Amps
Coil Type B — 2.7 Amps

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

Coil Type



A — Continuous, Economized with Suppression

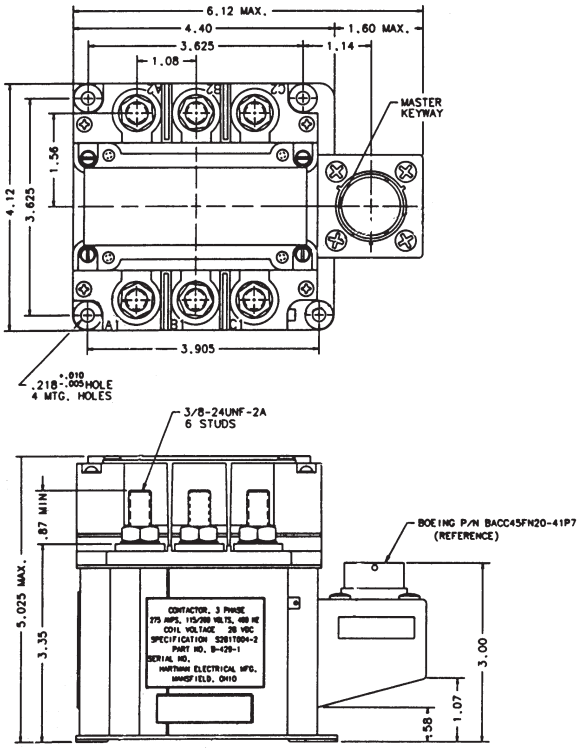


B — Continuous, Economized with Suppression

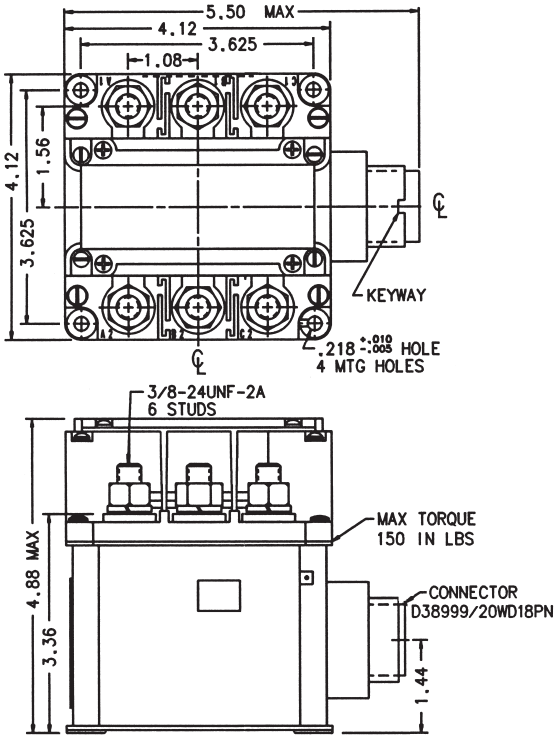
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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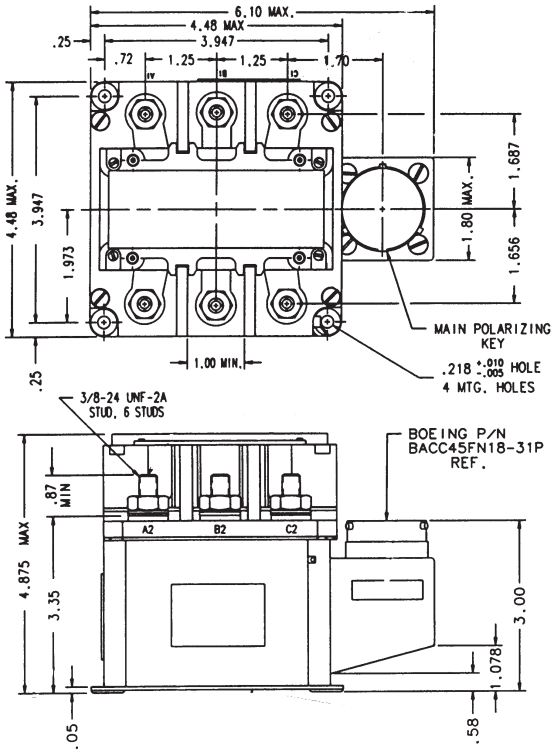
B-429 Series, 260/350 Amps, 115/200 VAC or 120/208 VAC (Continued)



Mounting Style A



Mounting Style B



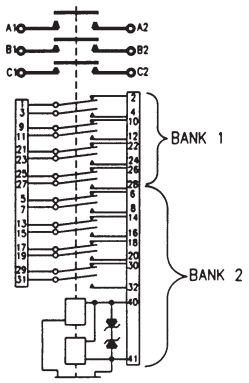
Mounting Style C

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

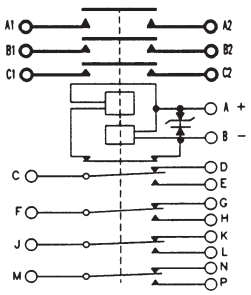
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B-429 Series, 260/350 Amps, 115/200 VAC or 120/208 VAC (Continued)

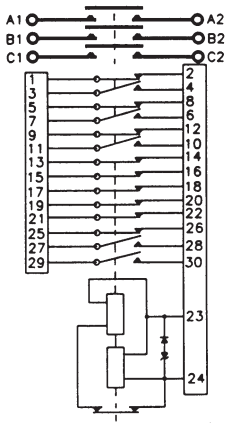
Circuit Configurations (Consult factory for other available circuit configurations)



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

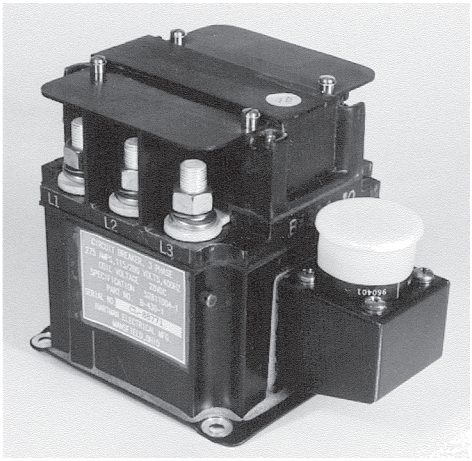
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

Downloaded from Arrow.com.

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)

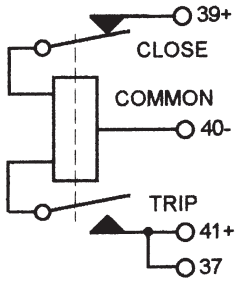
Operating Voltage Close, @ 85°C —
Min. — 15 Vdc
Max. — B-430-1 — 28 Vdc
B-430Z — 29 Vdc

Operating Voltage Trip, @ 85°C —
Min. — 15 Vdc
Max. — B-430-1 — 28 Vdc
B-430Z — 29 Vdc

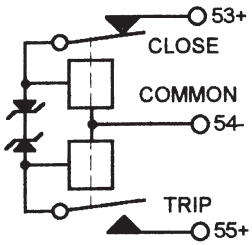
Coil Current Closing, Max. — 6 Amps

Coil Current Trip, Max. — 6 Amps

Coil Type



A — Continuous, Self-Deenergizing

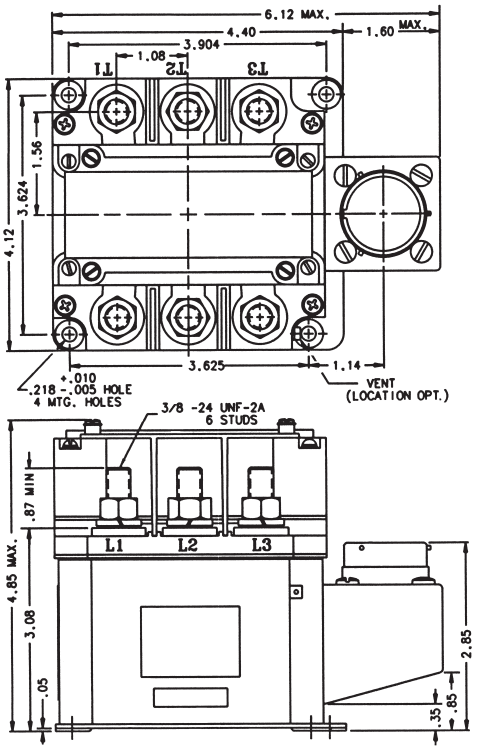


B — Continuous, Self-Deenergizing with Suppression

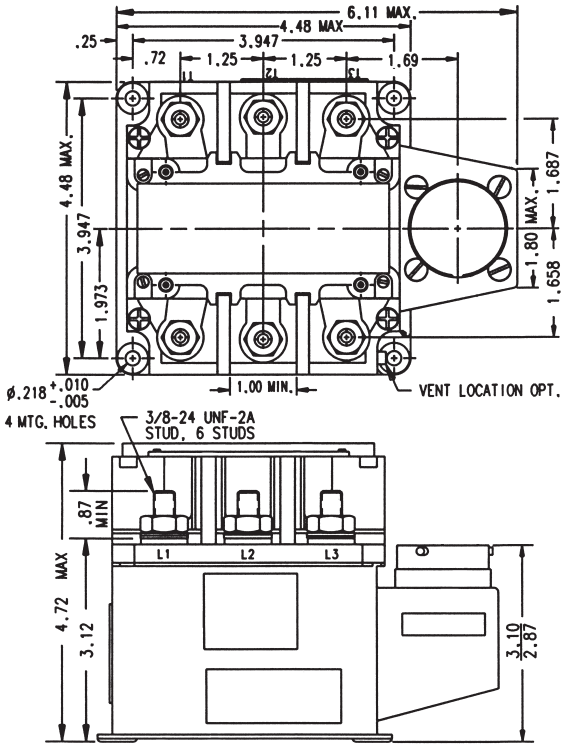
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

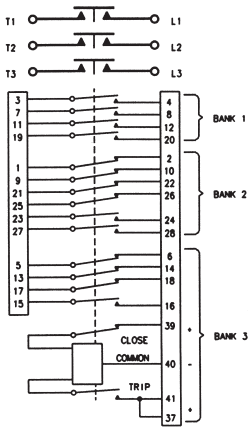


Mounting Style A

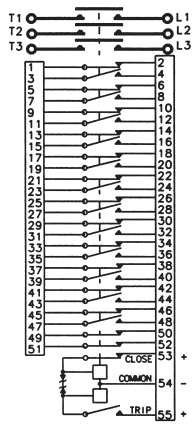


Mounting Style B

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 2

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

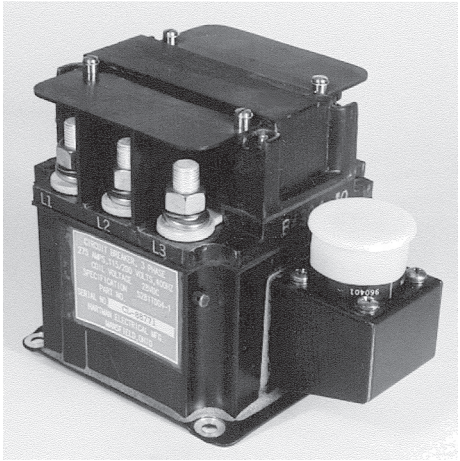
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

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

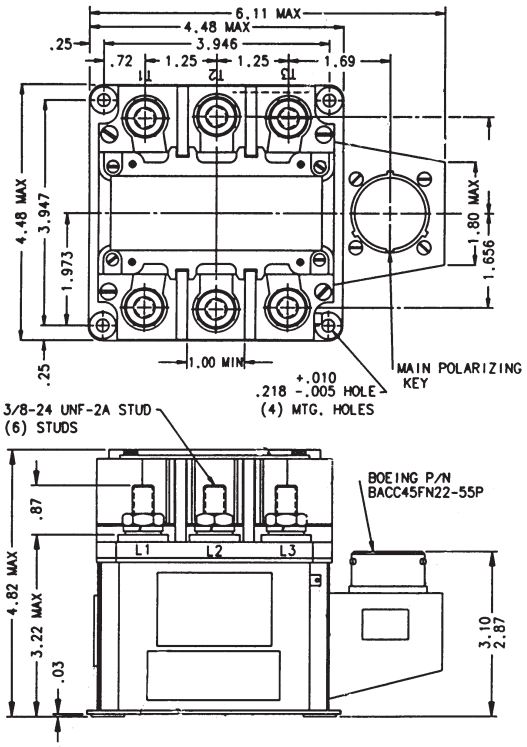
Close Voltage — Min. — 15 Vdc
Max. — 29 Vdc

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

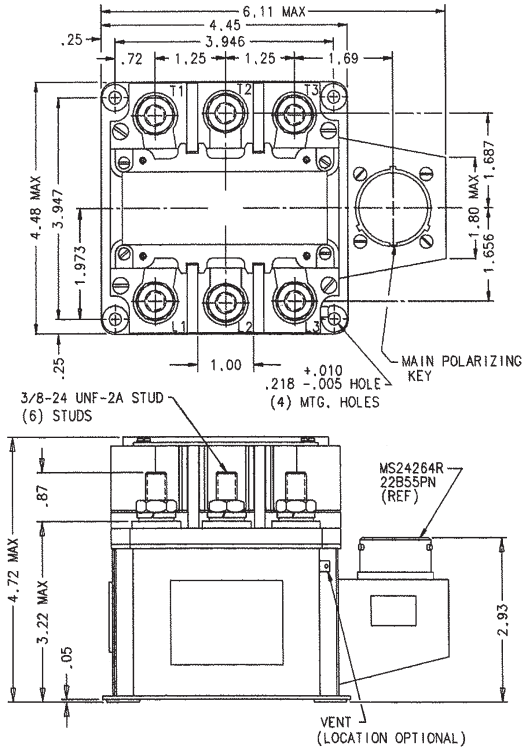
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

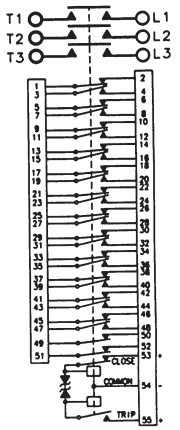


Mounting Style A



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.

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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.
		115	3PDT	Side Stable	–	28	Hermetic	Cont.	–	DH-14B	1-1616522-4
		115	3PDT	Side Stable	–	115V	Hermetic	Cont.	–	DHR-14B	1-1616037-2
25	AC	115/200	3PDT	Side Stable	–	28-31	Hermetic	Cont.	42	DH-14B-3	1616037-1
		115/200	3PDT	Side Stable	–	115V	Hermetic	Cont.	–	DHR-14BA	1-1616037-3
		115/200	3PST NO	Side Stable	–	28	Hermetic	Cont.	42	DH-14CE	1616017-1
30	AC	115	3PDT	Center Off	–	115V	Hermetic	Cont.	–	DHR-18-1	1616050-9
		115	DPDT	Side Stable	–	115V	Hermetic	Cont.	–	DHR-7K	1616522-2
		115	3PDT	Side Stable	SPST NO	28	Hermetic	Cont.	–	DH-7BB	1616037-7
		115/200	3PDT	Side Stable	DPDT	18-32	Hermetic	Cont.	50	DH-7ZAB	1-1616037-1
		120/208	3PDT	Side Stable	–	115V	Hermetic	Cont.	–	DHR-7B	1-1616037-6
		120/208	3PDT	Side Stable	–	115V	Hermetic	Cont.	–	DHR-7BE	1-1616037-7
		115	3PST	Center Off	–	28	Gasket/Vented	Cont.	20	D-18F	
1616048-4											
50	AC	115/200	3PDT	Center Off	–	28	Gasket/Vented	Cont.	–	D-18	1616048-1
		115/200	3PDT	Center Off	SPST NO Each Side	28	Gasket/Vented	Cont.	–	D-180A	1616048-2
		115/200	3PDT	Center Off	–	28	Gasket/Vented	Cont.	45	D-18AA	1616048-3
		115/200	3PDT	Center Off	6PDT	28	Gasket/Vented	Cont.	45	D-18ZZC	1-1616957-3
		115	3PDT	Center Off	–	28	Hermetic	Cont.	–	DH-18	1616050-1
		115/200	3PDT	Center Off	–	28-30	Hermetic	Cont.	–	DH-18Y	1616524-3
		115	SPDT	Center Off	–	35	Gasket/Vented	Cont.	–	DR-18E-5	1616099-1
		115/200	3PST	Side Stable	–	28	Gasket/Vented	Cont.	50	D-7M	1616016-2
		115/230	SPST	Side Stable	–	28	Gasket/Vented	Cont.	–	D7MA	1616016-3
		115/200	3PST NC	Side Stable	SPDT	28	Gasket/Vented	Cont.	45	D-7MM	1616016-4
		115/200	3PST NO	Side Stable	SPST NO SPST NC	115	Gasket/Vented	Cont.	–	DR-7VC	1616018-1
		115	3PST NO	Side Stable	SPST NO	28	Hermetic	Cont.	–	DH-7N	1616017-9
		115	3PST NO	Side Stable	SPST NO(2) SPST NC	28	Hermetic	Cont.	50	DH-7ZG-1	1-1616017-0
		115	3PST NO	Side Stable	–	120V	Hermetic	Cont.	–	DHR-7M	1616518-2
50	AC	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
		115/200	3PDT	Side Stable	DPDT	28	Gasket/Vented	Cont.	42	B-138XEH	1616028-3
60	AC	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

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Cross Reference (Continued)

Main Current Rating	AC/DC	Rating	Main Contact Config.	Operating Mode	Aux. Contact Config.	Coil Voltage (VDC)	Seal Type	Duty Cycle	Coil Trans. Voltage	Hartman Part No.	TE Part No.
100	AC	115/200	3PDT	Side Stable	SPST NC	28	Gasket/Vented	Cont.	–	D-25BD	1616034-3
		115/200	3PDT	Side Stable	–	28	Hermetic	Cont.	–	DH-25B	1616037-2
		115/200	3PDT NC	Side Stable	DPDT	28	Hermetic	Cont.	–	DH-25BA	1616037-3
		115/200	3PDT	Side Stable	–	115	Hermetic	Cont.	–	DHR-25BG	1-1616037-5
		115/200	3PDT	Center Off	–	28	Gasket/Vented	Cont.	–	D-31C	1616049-1
120	AC	115/200	3PDT	Center Off	5PST NC	28	Gasket/Vented	Cont.	–	D-31TH	1616524-5
		115/208	3PDT	Center Off	6PDT	28	Gasket/Vented	Cont.	42	D-31DB	1616049-2
		115/208	3PDT	Center Off	4PDT	18-30	Hermetic	Cont.	42	DH-31DAA	1616050-6
		115/200	3PDT	Center Off	6PDT	28	Hermetic	Cont.	–	DH-31A	1616050-4
		115/208	3PDT	Center Off	4PDT	18-30	Hermetic	Cont.	42	DH-31DA	1616050-5
		115/200	3PDT	Center Off Latching	6PDT	18-30	Hermetic	Cont.	50	DHL-31B	1616050-8
		115/200	3PST NO	Side Stable	(1)SPST NC (1) SPDT	28	Gasket/Vented	Cont.	–	D-25CF	1616015-1
		115/200	3PST NO	Side Stable	(1)SPST NO (1) SPST NC	28	Hermetic	Cont.	42	DH-25CU	1616017-4
125	AC	115/200	3PDT	Side Stable	DPDT	28	Gasket/Vented	Cont.	45	D-25BAH	1616034-2
130	AC	115/200	3PST NO	–	3PST NO	28	Gasket	Cont.Econ	–	B309A	1-1616975-7
175	AC	115/200	3PST	Mag Latching	6PDT	15-30	Gasket/Vented	Cont.	42	B-451	1616023-3
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

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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.

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K Series, Rated up to 200 Amps, 28 Vdc

Product Facts

- Among the smallest and lightest 200 A aerospace-quality contactors available
- High-quality materials to help withstand harsh environments
- Environmentally sealed
- -55° to +85°C temperature range
- Shock and vibration resistant
- SPST, normally open
- 28 Vdc
- 200 A make/carry/break
- 1200 A inrush
- 2000 A maximum interrupt
- Electronically economized to reduce power

Standards/Specifications

MIL-PRF-6106P — General Performance Specification for Electromechanical Relays

MIL-STD-202H — Test Method for Electronic and Electrical Component Parts

RTCA/DO-160F — Environmental Conditions and Test Procedures for Airborne Equipment



Performance Data

Electrical Characteristics

Main Contacts — 28 VDC SPST Normally Open, Double Make

Auxiliary Contacts — two-pole, double-throw

Economizer — Electronically controlled

Full Rupture Capability — 2000 A (50 cycles per MIL-PRF-6106)

Electrical Life —
Full Rated Resistive Load — 50,000 cycles
25% Rated Resistive Load — 100,000 cycles

Altitude — 50,000 feet max.

Current — Resistive Load: 200 A
Motor Load — 1200 A/200 A (inrush/carry)
Rupture: 2000 A

General Characteristics

Operating Temperature — 55°C to +85˚C

Weight —
K200A1C: 0.33 lbs (150 g)
K200B1C: 0.29 lbs (132 g)
K200A3C: 0.43 lbs (195 g)
K200B3C02: 0.40 lbs (181 g)

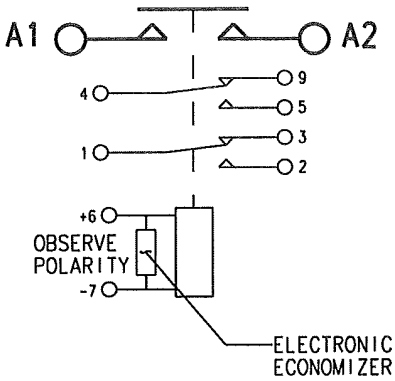
Coil Characteristics

Nom. Operate Voltage — 28 Vdc
Pickup Voltage — 18 Vdc max.
Drop Voltage — 1–9 Vdc
Pickup Time — 15 ms
Dropout Time — 15 ms

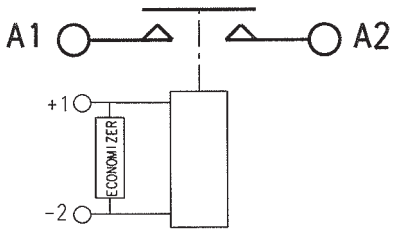
Coil Current —
Inrush — 5 A max. at 28 Vdc and 25°C
Holding — 300 mA max. at 28 Vdc and 25°C
Suppression — 45 Vdc

Circuit Configurations

(Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 2

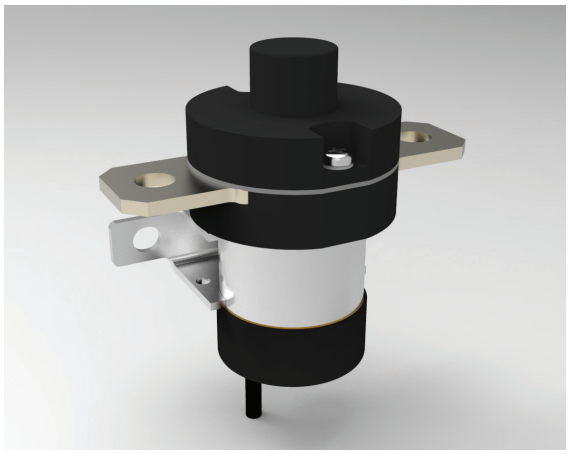
Model	Mounting	Aux. Contacts	Part No.
K200A1C	Chassis	No	5-1616970-9
K200A3C	Chassis	Yes	8-1616977-1
K200B1C	Bus Bar	No	6-1616970-0
K200B3C02	Bus Bar	Yes	4-1616968-7

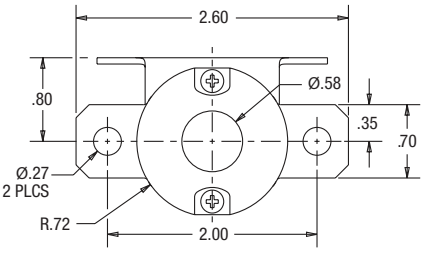
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

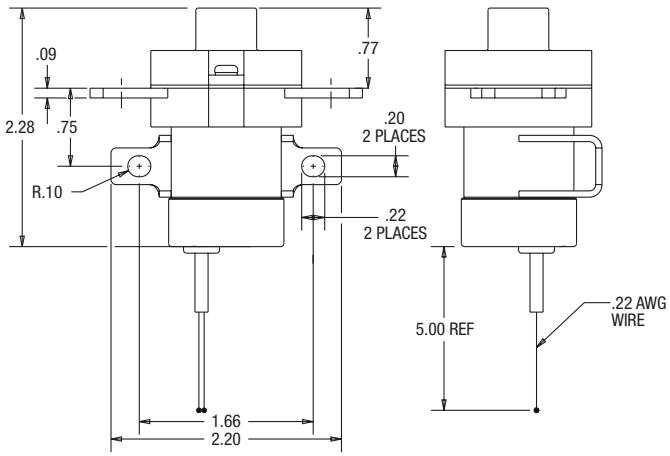
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K200 Series, Rated up to 200 Amps, 28 Vdc (Continued)

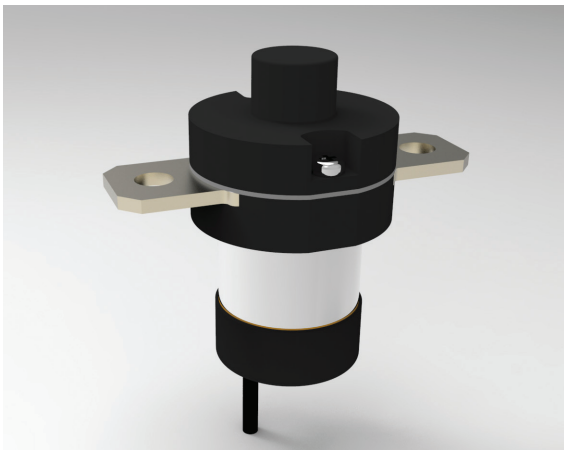
Chassis Mount

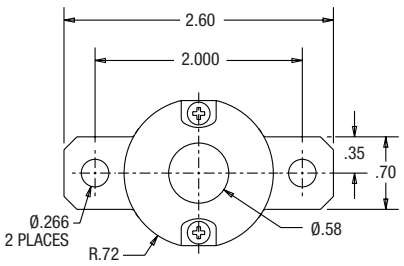


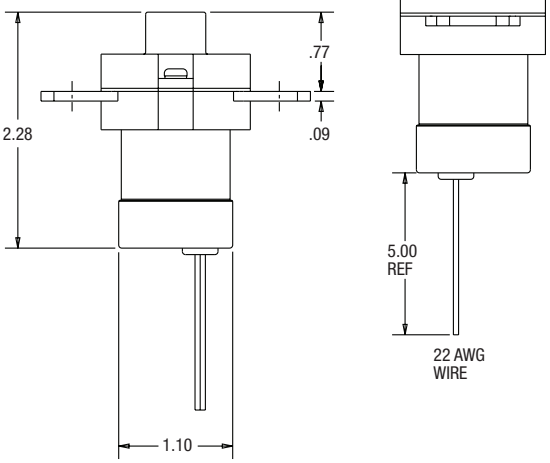




Bus Bar Mount





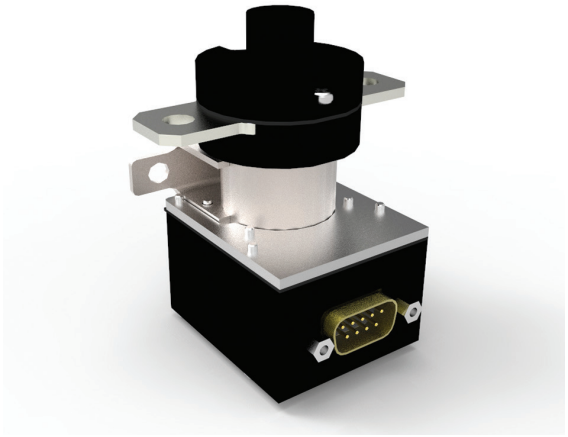


For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

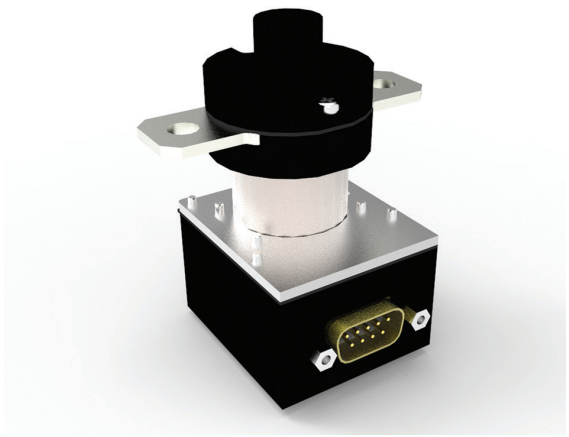
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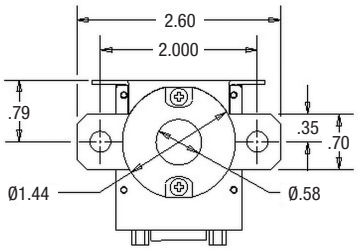
K200 Series, Rated up to 200 Amps, 28 Vdc (Continued)

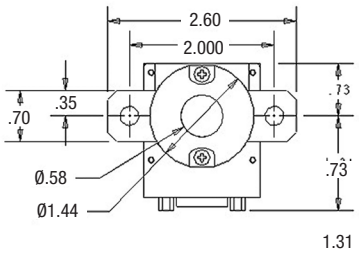
Chassis Mount

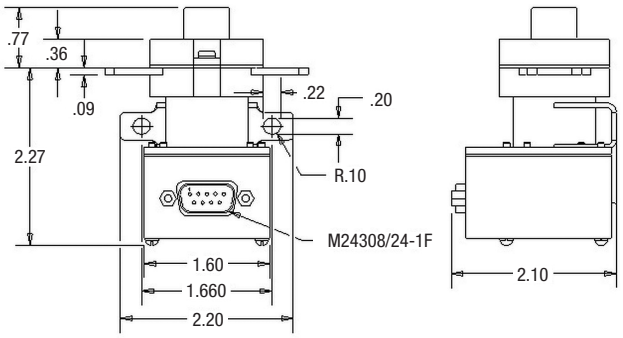


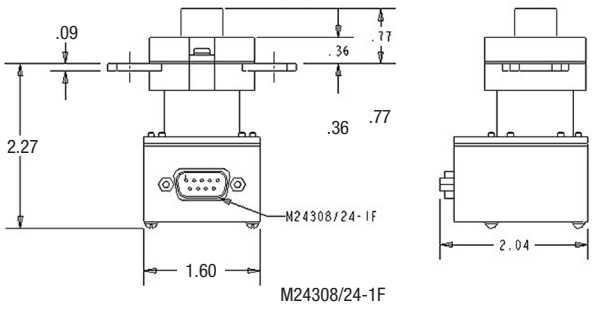
Bus Bar Mount

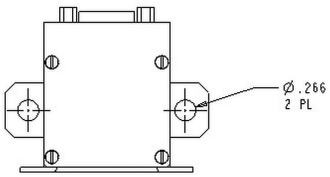


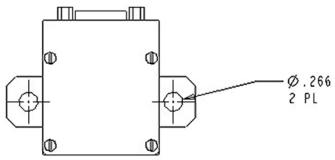












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K400 Series, Rated up to 400 Amps, 28 Vdc



Product Facts

- SPST NO, Double break
- Buss bar or chassis mount design
- 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

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

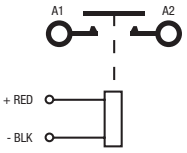
12 Vdc - Intermittent duty coil

Dropout Voltage, Max. —

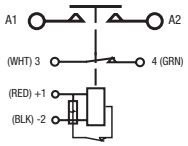
7 Vdc - Economized and continuous duty

5 Vdc - Intermittent duty coil

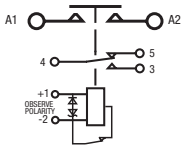
Circuit Configurations (Consult TE for other available circuit configurations)



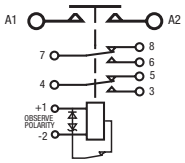
Circuit Configuration 1



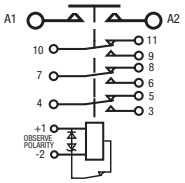
Circuit Configuration 2



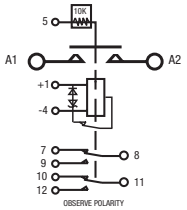
Circuit Configuration 3



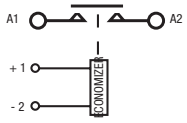
Circuit Configuration 4



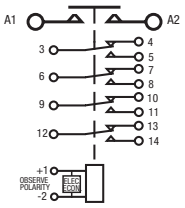
Circuit Configuration 5



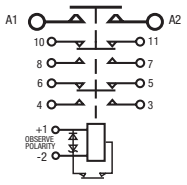
Circuit Configuration 6



Circuit Configuration 7



Circuit Configuration 8



Circuit Configuration 9

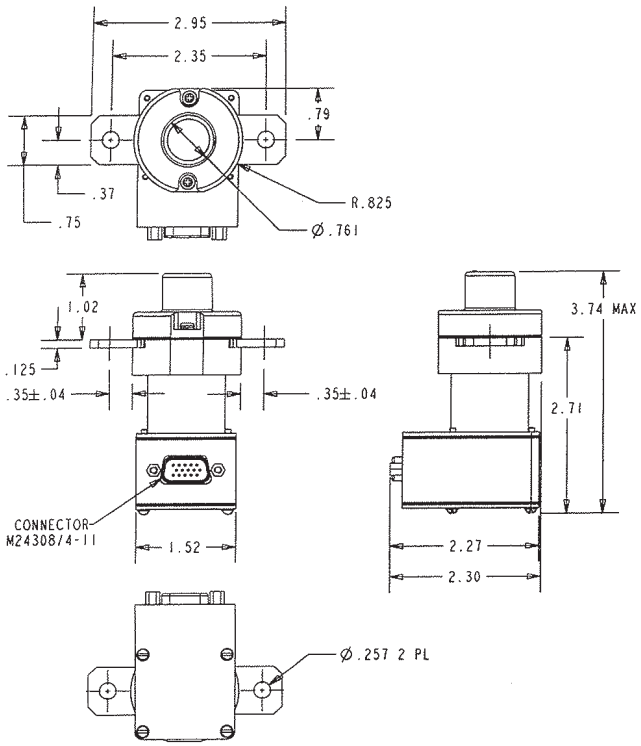
Coil Type

HARTMAN Part No.	Mounting Style	Coil Type	Circuit Configuration	TE Part No.
K4001A3C	Chassis Mount	Economized with Suppression	4	6-1616968-5
K4001B3C	Bus Bar Mount		4	4-1616959-0
K400A1F	Chassis Mount	Continuous	1	6-1616945-7
K400A4C1		Economized with Suppression	2	6-1616965-1
K400B1F	Bus Bar Mount	Continuous	1	2-1616921-3
K400B3C05		Economized with Suppression	6	7-1616941-3
K4001B7C			5	4-1616959-8
K4001A7C	Chassis Mount		5	6-1616970-7
K4001B2C	Bus Bar Mount		3	6-1616970-8
K4001A2C	Chassis Mount		3	6-1616970-6
K4001A1C1			7	6-1616998-5
K4001B1C1	Bus Bar Mount		7	6-1616998-6
K4001B8C2			8	5-1616986-8
K4001B8C3			8	5-1616986-9
K4001B8C4			8	9-1616986-6
K4001B5C2			9	8-1616982-7

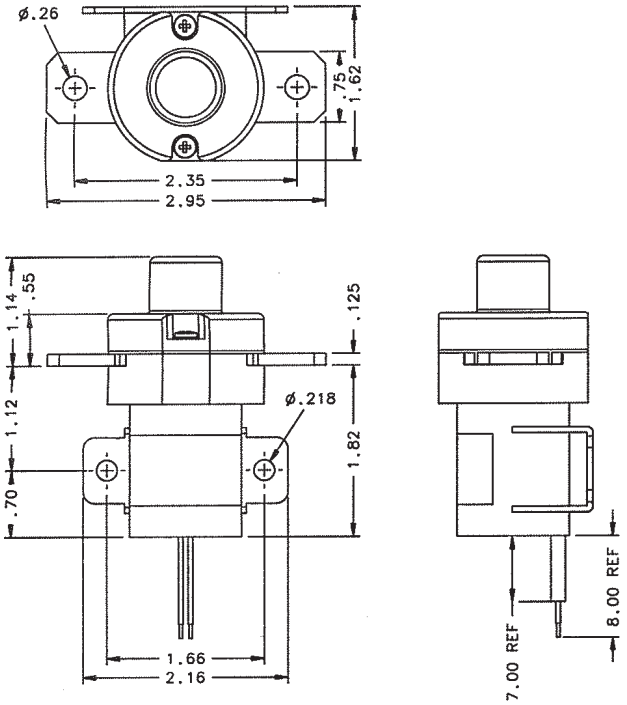
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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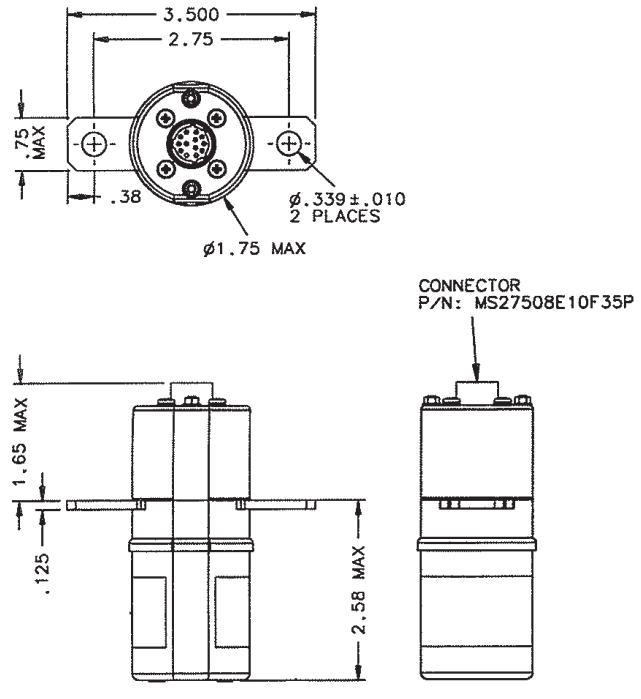
K400 Series, Rated up to 400 Amps, 28 Vdc (Continued)



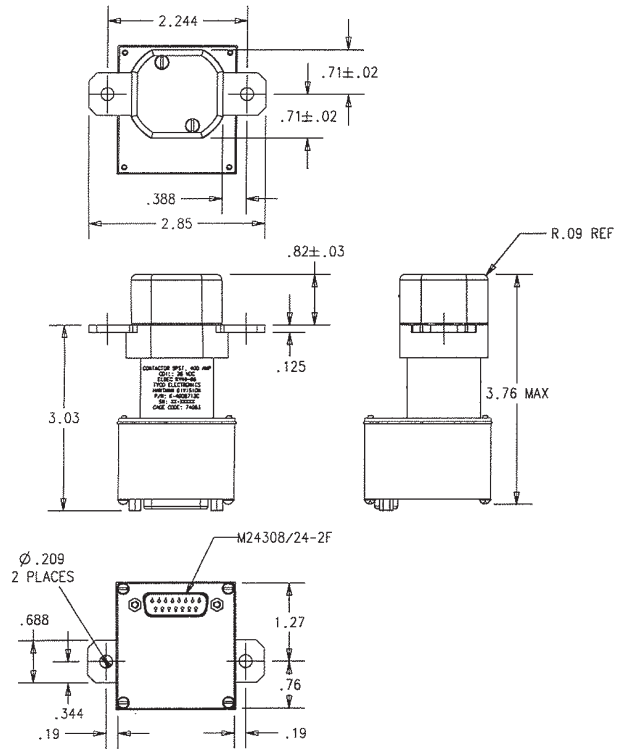
Mounting Style A



Mounting Style B



Mounting Style C

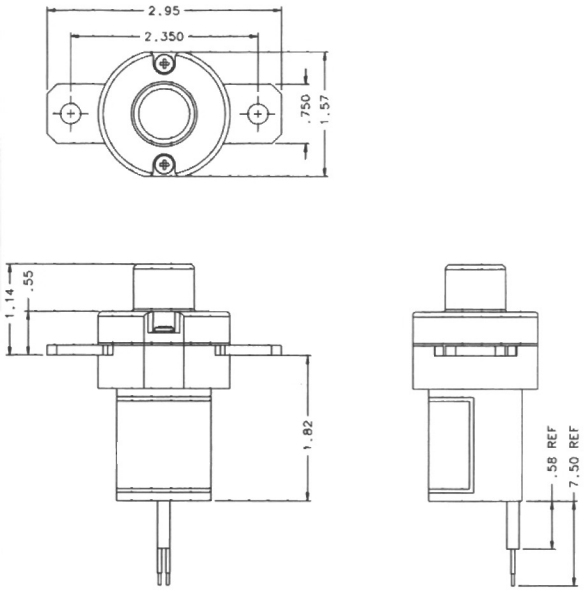


Mounting Style D

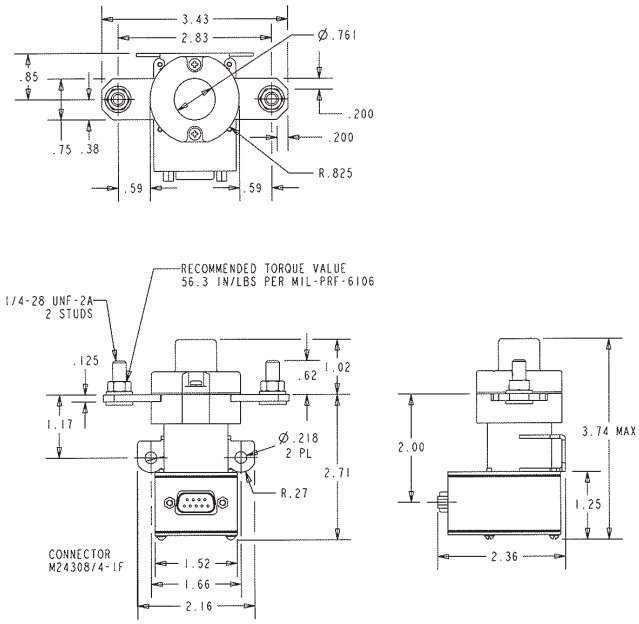
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

Downloaded from Arrow.com.

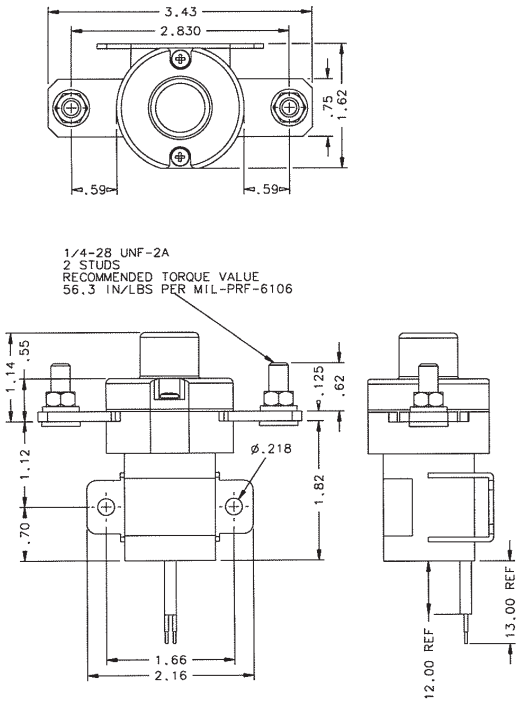
K400 Series, Rated up to 400 Amps, 28 Vdc (Continued)



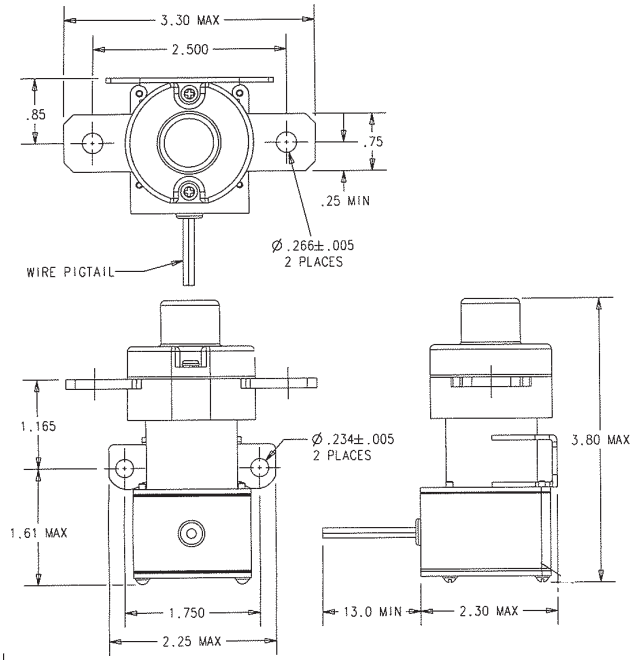
Mounting Style E



Mounting Style F



Mounting Style G



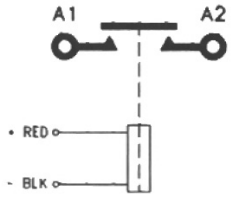
Mounting Style K

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

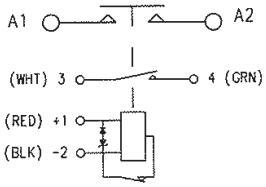
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K400 Series, Rated up to 400 Amps, 28 Vdc (Continued)

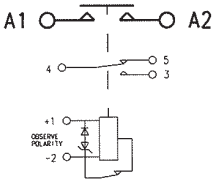
Circuit Configurations (Consult factory for other available circuit configurations)



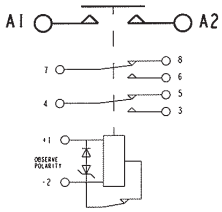
Circuit Configuration 1



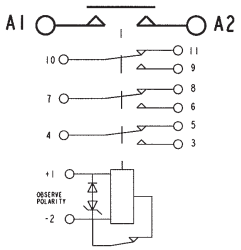
Circuit Configuration 2



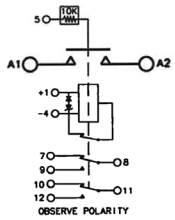
Circuit Configuration 3



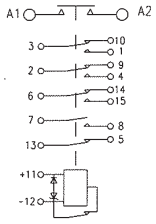
Circuit Configuration 4



Circuit Configuration 5



Circuit Configuration 6

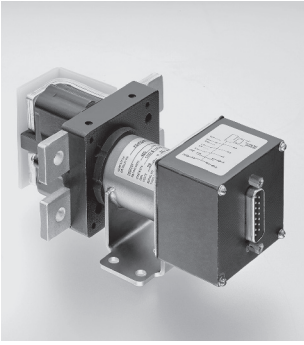


Circuit Configuration 7

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

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K400 Series, Rated up to 400 Amps, 28 Vdc



Product Facts

- **1.88 to 2 lbs. (854 to 908 grams) depending on style selected**
- **< 30 cubic inches (490 cm³) volume**
- **400 A make/carry/break**
- **4000 A rupture**
- **28 VDC**
- **One NO and one NC**
- **Electronically economized to reduce power**
- **Configuration flexibility**
- **Multiple mounting options**
- **-55°C to +70°C operating temperature range**
- **Meets applicable requirements of MIL-PRF-6106M**

Performance Data

Electrical Characteristics

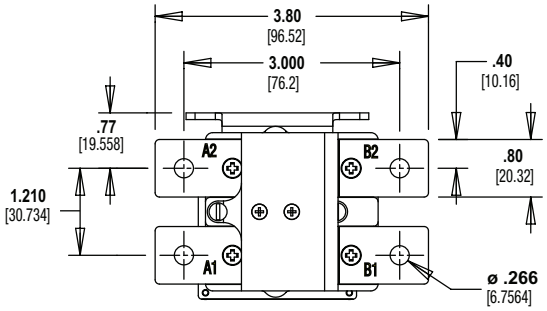
Main Contacts —
Configuration — One NO and one NC
Voltage — 28 VDC
Current (Resistive Load) — 400 A
Rupture Current — 4000 A
Voltage Drop — 150 mV max.
Auxiliary Contacts —
Configuration — SPDT
Number of Auxiliary Contacts — 1 to 3
Voltage — 28 VDC
Current:
Resistive Load — 5 A
Inductive Load — 1 A
Bounce — 5 ms at 28 VDC, 25°C
Dielectric Withstand — 1000 Vrm

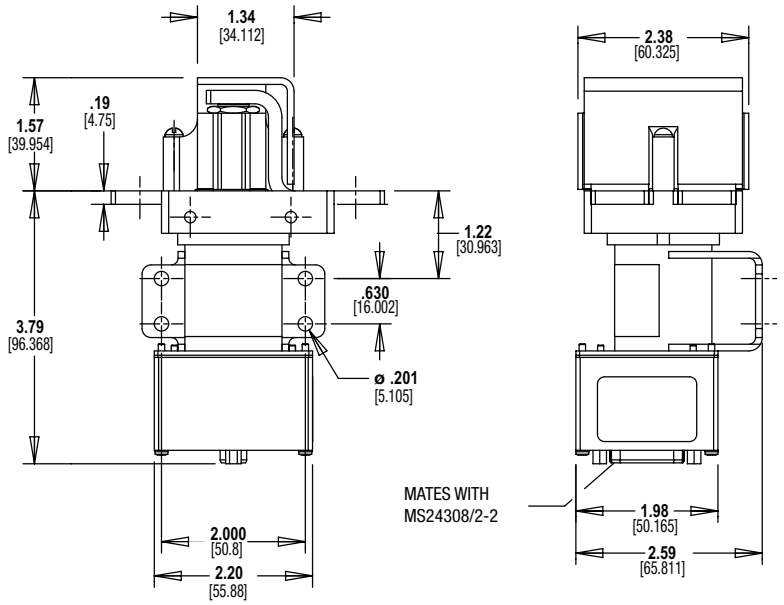
General Characteristics

Operating Temperature — -55°C to +70°C
Ground Survivability Temperature — -55°C to +85°C
Altitude — 55,000 ft.
Decompression — 55,000 ft.
Electrical Life — 50,000 cycles
Mechanical Life — 100,000 cycles
Mounting Styles — Chassis, captive screw, or bus bar
Weight — 1.88 to 2 lb. (854 to 908 g) depending on style

Coil Characteristics

Duty Cycle — Continuous (Electronic Economized)
Pickup Voltage — 18 VDC nom., 20 VDC max. at 85°C
Max. Operating Voltage — 32 VDC
Dropout Voltage — 1.5 to 7 VDC
Inrush Current — 12 A max. (100 ms)
Pickup and Dropout Time — 25 ms at 25°C
Suppression — ±42 V





Style	Description	Part No.
Chassis Mount	KD400A7C	1616986-6
Bus Mount	KD400B2C2	1-1616989-7

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K500 Series, Rated up to 500 Amps, 28 Vdc



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

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

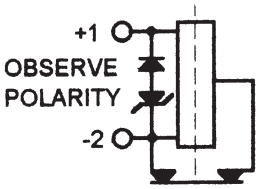
Pickup Voltage, Max. — 18 Vdc

Dropout Voltage — 1 to 7 Vdc

Inrush — 5 Amps

Hold @ 32 Vdc & -55°C — 0.272 mA max.

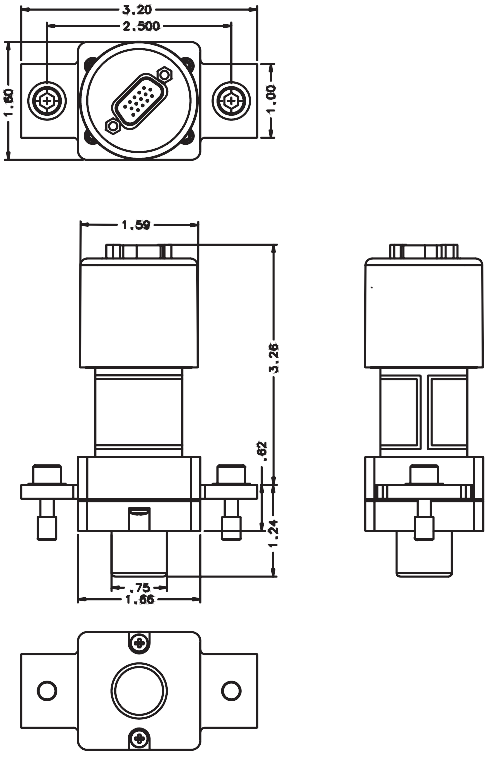
Coil Type



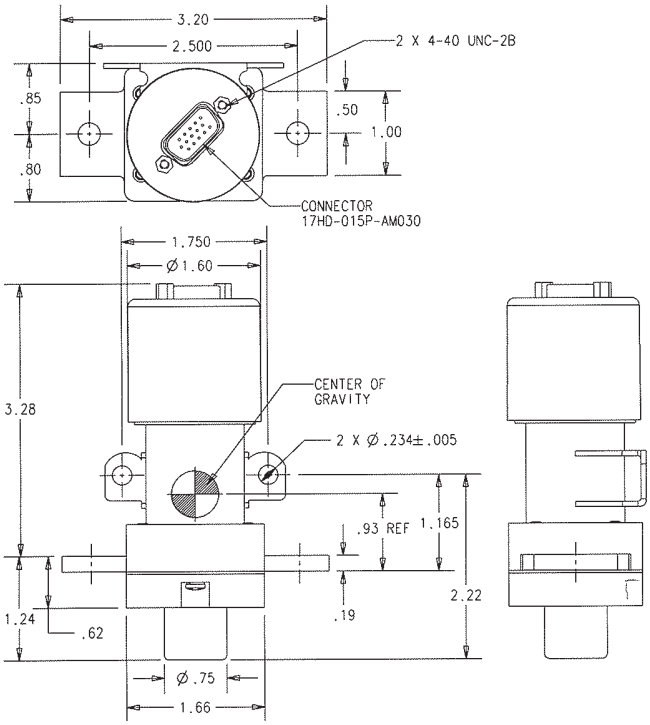
A — Economized with Suppression

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K500 Series, Rated up to 500 Amps, 28 Vdc (Continued)



Mounting Style A



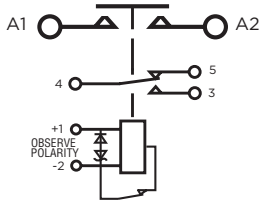
Mounting Style B

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

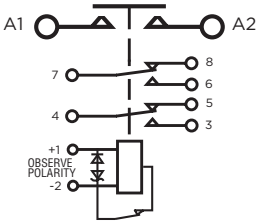
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K500 Series, Rated up to 500 Amps, 28 Vdc (Continued)

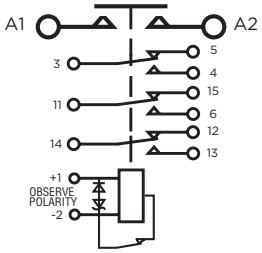
Circuit Configurations (Consult TE for other available circuit configurations)



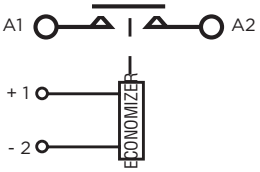
Circuit Configuration 1



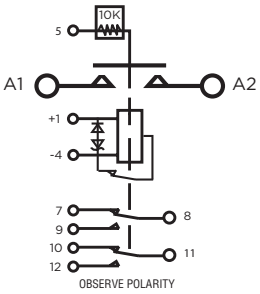
Circuit Configuration 2



Circuit Configuration 3



Circuit Configuration 4



Circuit Configuration 5

HARTMAN Part No.	Mounting Style	Coil Type	Circuit Configuration	TE Part No.
K500B2C	Bus Bar Mount	Economized with Suppression	1	7-1616927-0
K500A2C	Chassis Mount		1	4-1616951-4
K500B3C	Bus Bar Mount		2	7-1616970-0
K500A3C	Chassis Mount		2	6-1616970-9
K500B7C01	Bus Bar Mount		3	9-1616965-0
K500A7C01	Chassis Mount		3	2-1616970-8
K500A1C			4	1-1616992-7
K500B1C	Bus Bar Mount		4	2-1616992-8
K500B3C02			5	7-2252003-3

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

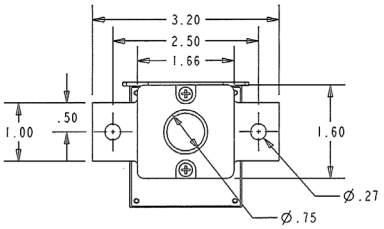
Altitude — 50,000 ft

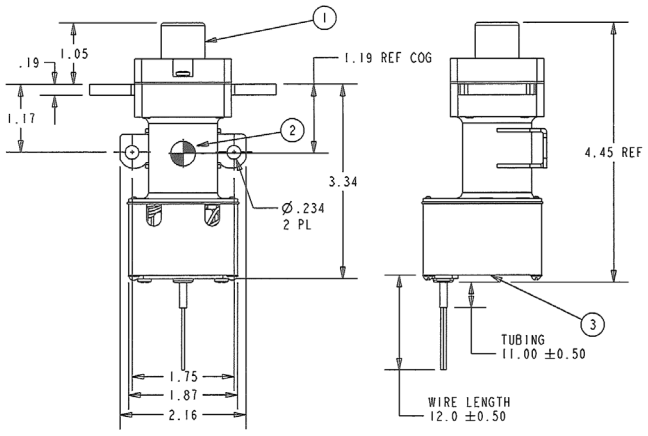
Weight, Max. — 1.0 lbs

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.

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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

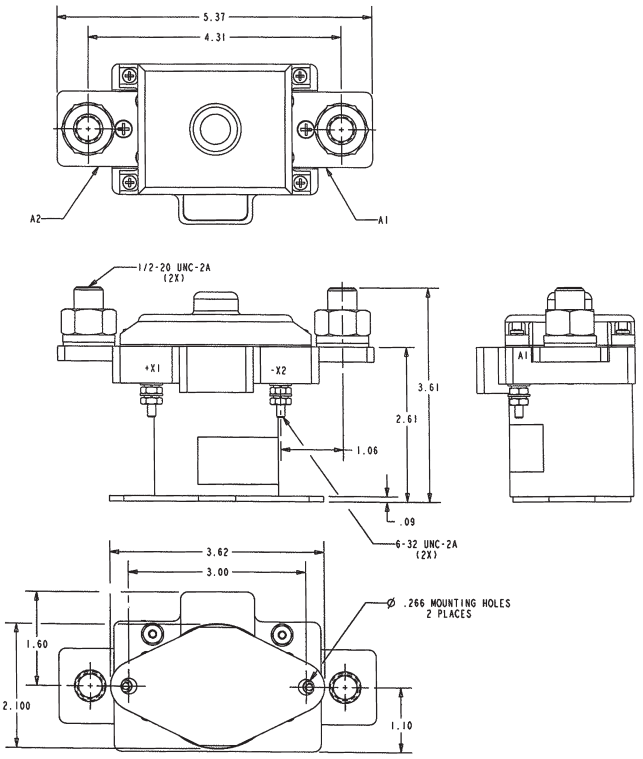
Operating Voltage, Nom. — 28 Vdc

Pickup Voltage, Max. @25°C — 18 Vdc

Dropout Voltage — 1 to 8 Vdc

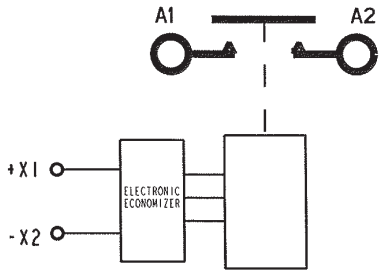
Current, Inrush, Max. @ 30 Vdc — 7.0 Amps

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.

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Cross Reference

Main Current Rating	AC/DC	Rating	Main Contact Config.	Operating Mode	Aux. Contact Config.	Coil Voltage	Seal Type	Duty Cycle	Coil Trans. Voltage (VDC)	HARTMAN Part No.	TE Part No.
200	DC	28	SPST NO	Side Stable	2PDT	28	Gasket	Cont. Econ.	42	K200A1C	5-1616970-9
		28	SPST NO	Side Stable	2PDT	28	Gasket	Cont. Econ.	42	K200B3C02	4-1616968-7
		28	SPST NO	Side Stable	2PDT	28	Gasket	Cont. Econ.	42	K200B1C	6-1616970-0
		28	SPST NO	Side Stable	2PDT	28	Gasket	Cont. Econ.	42	K200A3C	8-1616977-1
400	DC	28	SPST NO	Side Stable	2PDT	28	Gasket	Cont. Econ.	42	K4001A3C	6-1616968-5
		28	SPST NO	Side Stable	2PDT	28	Gasket	Cont. Econ.	42	K4001B3C	4-1616959-0
		28	SPST NO	Side Stable	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	–	28	Gasket	Cont. Econ.	42	K4001A1C1	6-1616988-2
500	DC	28	SPST NO	Side Stable	1PDT	28	Gasket	Cont. Econ.	42	K500B2C	7-1616927-0
		28	SPST NO	Side Stable	2PDT	28	Gasket	Cont. Econ.	42	K500B3C	7-1616970-0
		28	SPST NO	Side Stable	2PDT	28	Gasket	Cont. Econ.	42	K500A3C	6-1616970-9
		28	SPST NO	Side Stable	1PDT	28	Gasket	Cont. Econ.	42	K500A2C	4-1616951-4
		28	SPST NO	Side Stable	3PDT	28	Gasket	Cont. Econ.	42	K500A7C01	2-1616970-8
		28	SPST NO	Side Stable	3PDT	28	Gasket	Cont. Econ.	42	K500B7C01	9-1616965-0
		28	SPST NO	Side Stable	–	28	Gasket	Cont. Econ.	42	K500A1C	1-1616992-7
1000	DC	28	SPST NO	Side Stable	–	28	Gasket	Continuous	–	K1000A1F03	4-1616966-1

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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

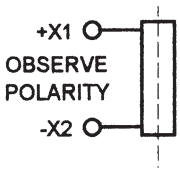
Duty Cycle — Continuous (Type A, See diagram below), Continuous with suppression (Type B, See diagram below) or Intermittent (Type C)

Operating Voltage, Nom. — 28 Vdc

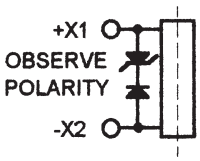
Pickup Voltage @ 25°C, Max. — 18 Vdc

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

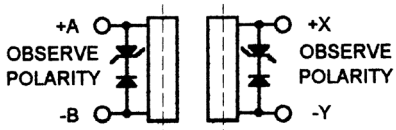
Coil Type



A — Continuous



B — Continuous with Suppression

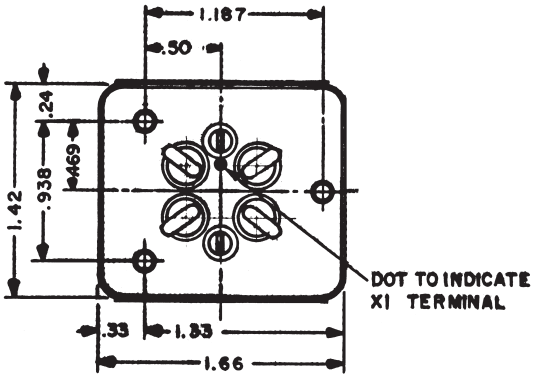


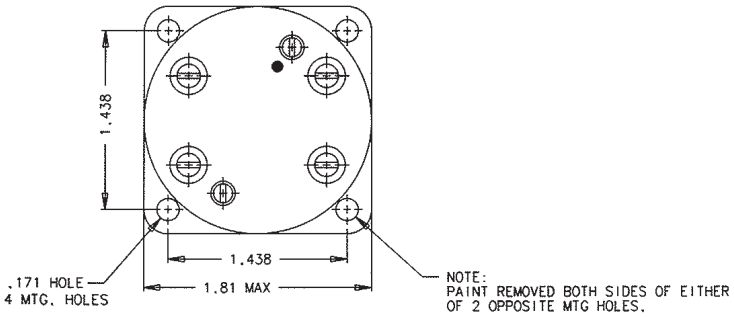
C — Intermittent

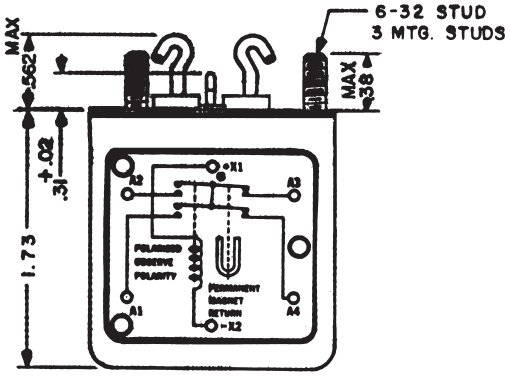
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

Downloaded from Arrow.com.

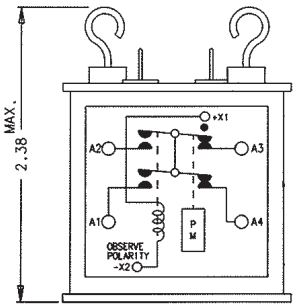
DH-14 and DH-21 Series, Rated up to 25 Amps, 28 Vdc (Continued)



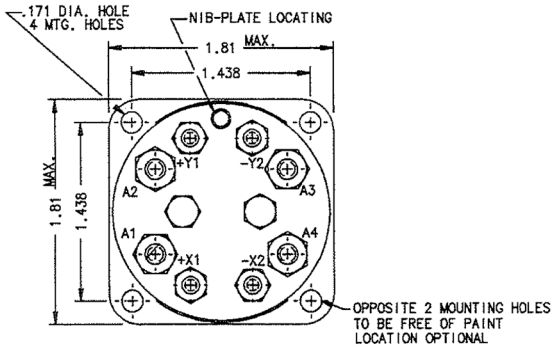


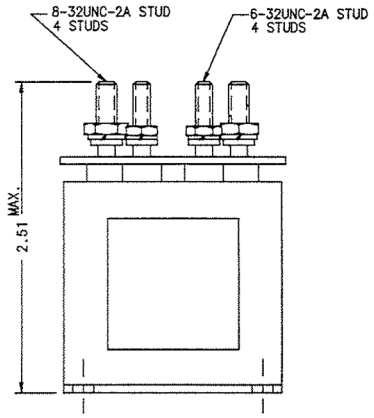


Mounting Style A



Mounting Style B





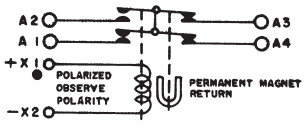
Mounting Style C

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

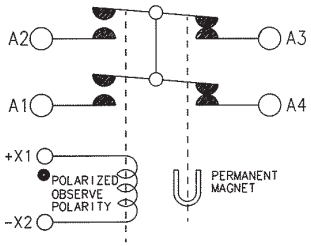
Downloaded from Arrow.com.

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

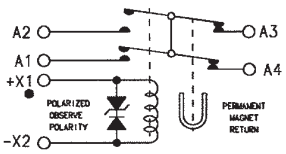
Circuit Configurations (Consult factory for other available circuit configurations)



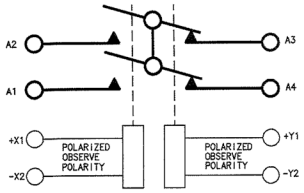
Circuit Configuration 1



Circuit Configuration 2



Circuit Configuration 3



Circuit Configuration 4

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

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

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

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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)

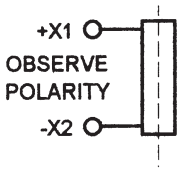
Operating Voltage, Nom. — 28 Vdc

Pickup Voltage @ 25°C, Max. — 18 Vdc

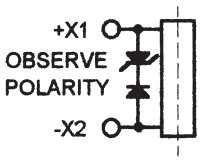
Dropout Voltage @ 25°C, Max. — 1.5 to 7 Vdc

Coil Current @ 25°C, Max. — 0.28 Amp

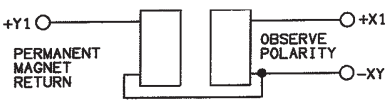
Coil Type



A — Continuous



B — Continuous with Suppression

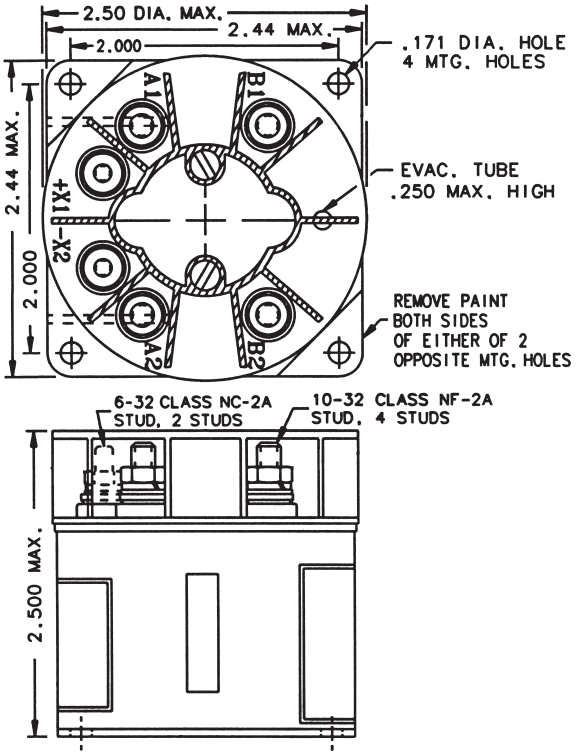


C — Continuous

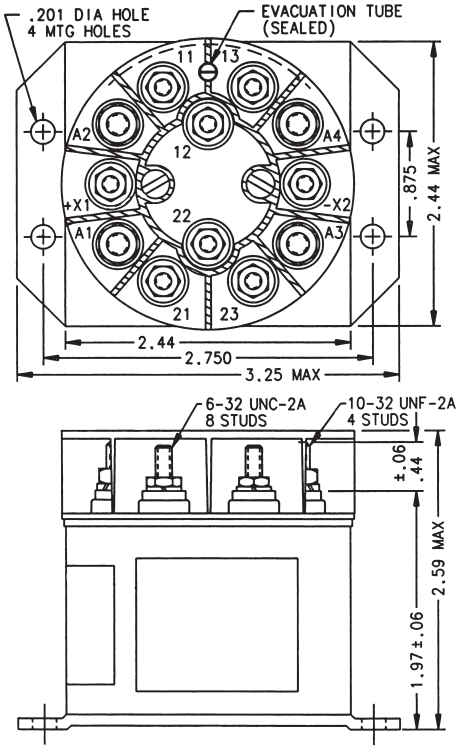
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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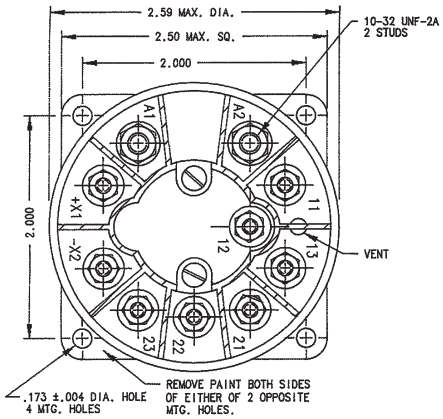
D-7, DH-7 and DH-18 Series, Rated up to 50 Amps, 28 Vdc (Continued)

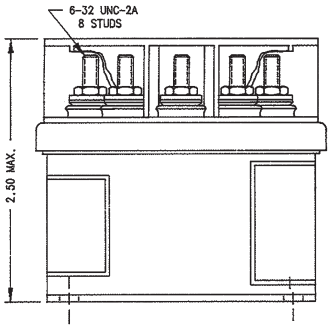


Mounting Style A

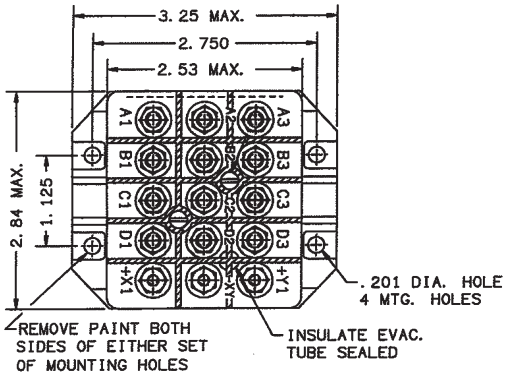


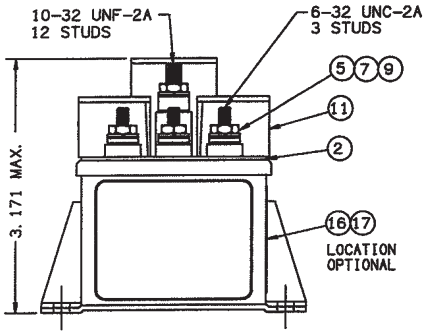
Mounting Style B





Mounting Style C



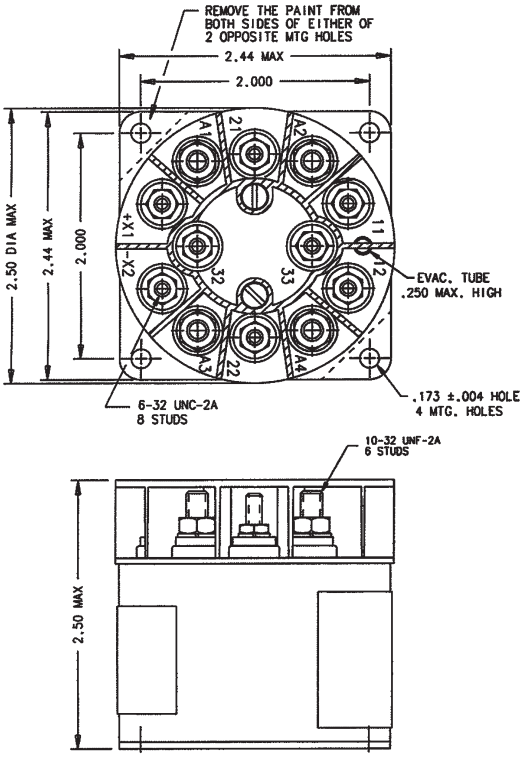


Mounting Style D

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

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



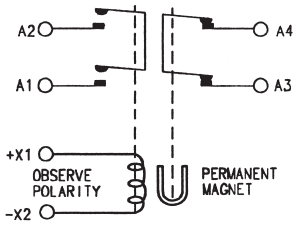
Mounting Style E

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

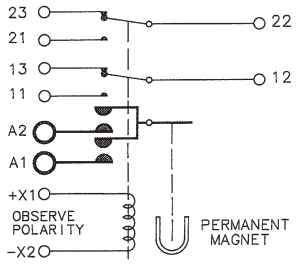
Downloaded from Arrow.com.

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

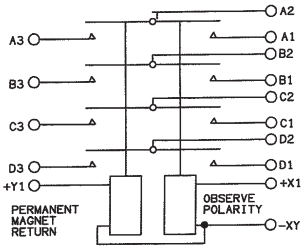
Circuit Configurations (Consult factory for other available circuit configurations)



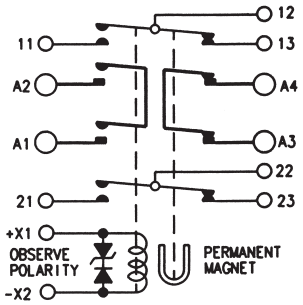
Circuit Configuration 1



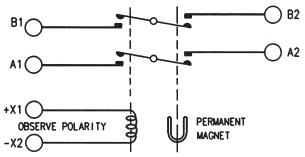
Circuit Configuration 2



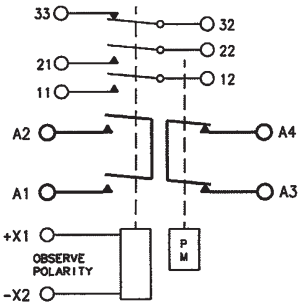
Circuit Configuration 3



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.

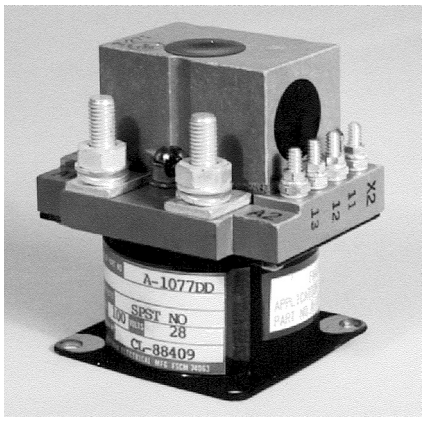
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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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

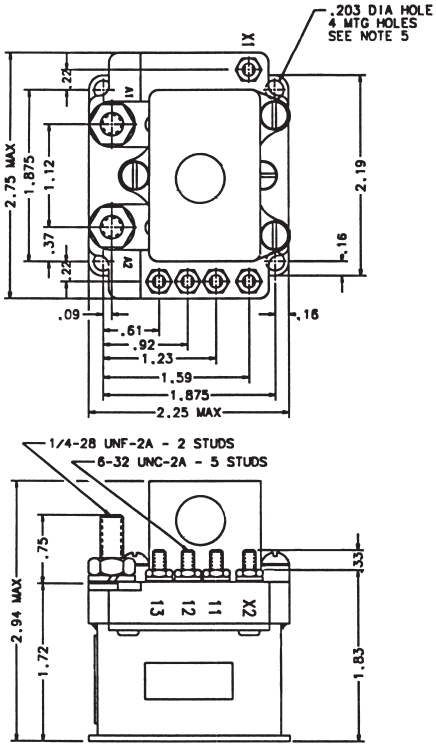
Pickup Voltage @ 25°C, Max. — 16.5 Vdc

Dropout Voltage — 1 to 7 Vdc

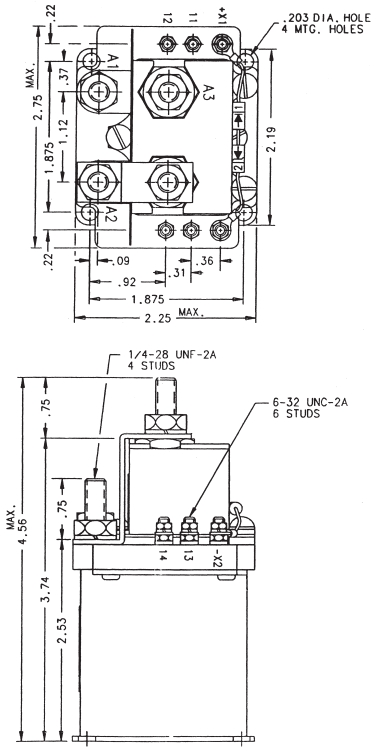
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

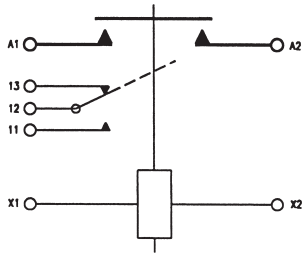


Mounting Style A

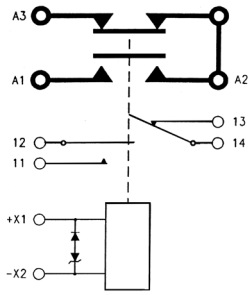


Mounting Style B

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.

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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 —

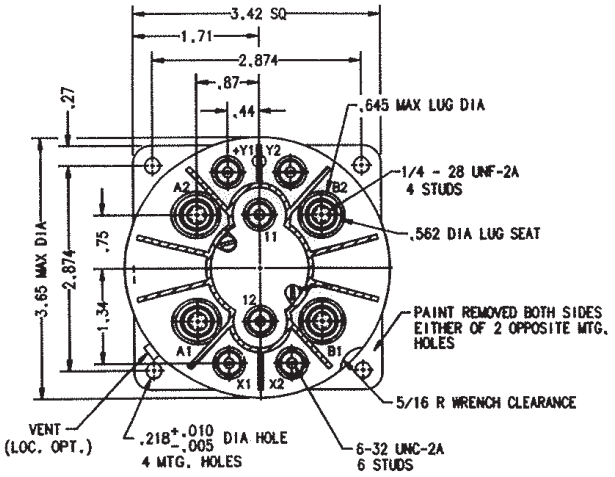
Operating Voltage, Nominal — 28 Vdc

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

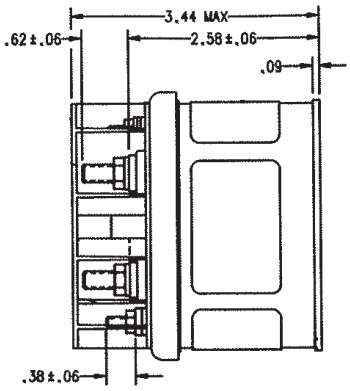
Dropout Voltage @ 25°C — 2.0 V to 6.5 V

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

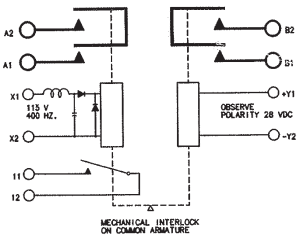
Coil Current @ 25°C — .215 Amp Max. @ 28 Vdc



Mounting Style A



Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

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

Downloaded from Arrow.com.

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

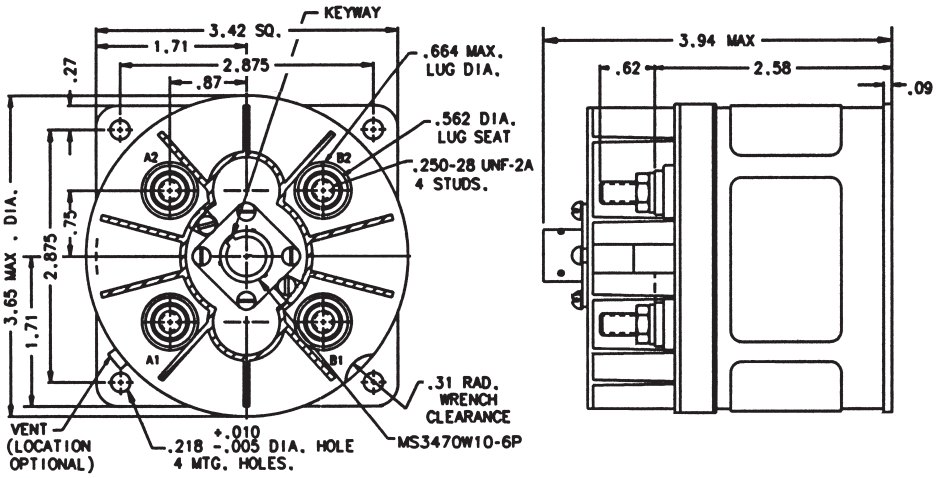
Pickup Voltage, Max. — 18 Vdc

Dropout Voltage, Max. — 1.5 to 7.5 Vdc

Hold Voltage — 8.0 Vdc

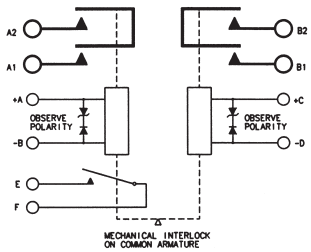
Coil Resistance ±10% @ 77°F — 163 Ohms

Coil Current @ 77°F & 30 Vdc, Max. — 0.215 Amp



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
D-32A	Gasket/Vented	A	Continuous w/ Suppression	1	1616097-2

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

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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

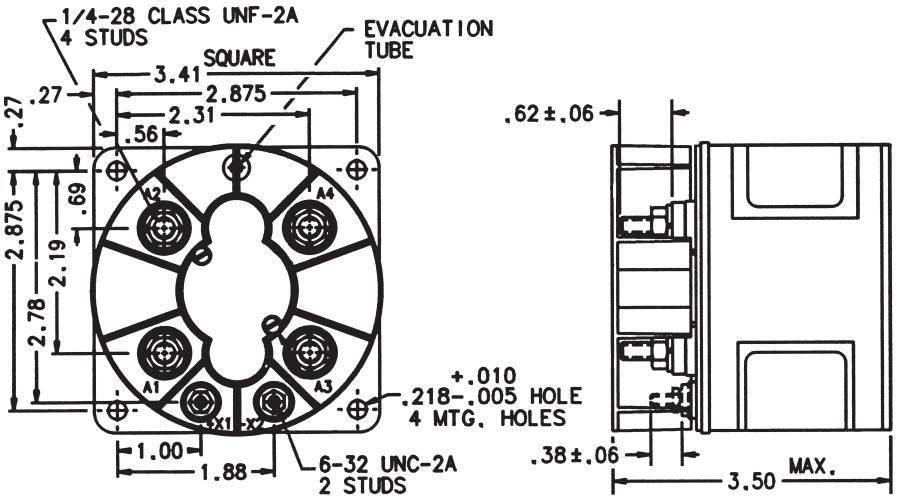
Duty Cycle — Continuous

Operating Voltage, Max. — 32 Vdc

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

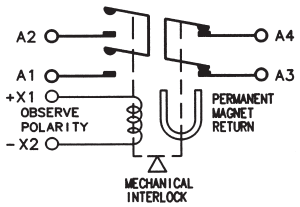
Dropout Voltage @ 25°C, Max. — 1.0 to 7 Vdc

Coil Resistance ±20% @ 25°C — 180 Ohms



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
DH-25EA	Hermetically Sealed	A	Continuous	1	1616089-4

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

Downloaded from Arrow.com.

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

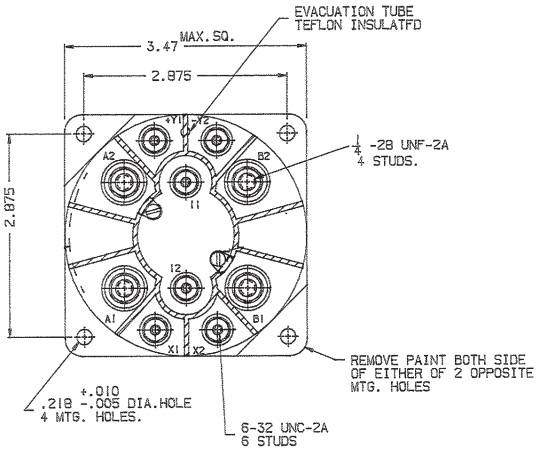
Operating Voltage, Nom. —

Coil X1-X2 (120 V, 400 Hz) —
- Pickup 100 V Max. Hot
- Dropout 25 V ± 20 V
- Nom. Resistance 1050 Ohms ± 10%

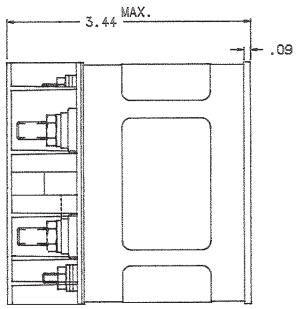
Coil Y1-Y2 (28 Vdc) —
- Pickup 20 Vdc Max. Hot
- Dropout 1.5 to 7 Vdc
- Nom. Resistance 163 Ohms ± 10%

Coil Current @ Nom. 120 V — X1-X2 — 0.12 Amp at 25°C

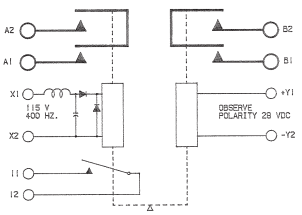
Coil Current @ Nom. 28 Vdc — Y1-Y2 — 0.19 Amp at 25°C



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.

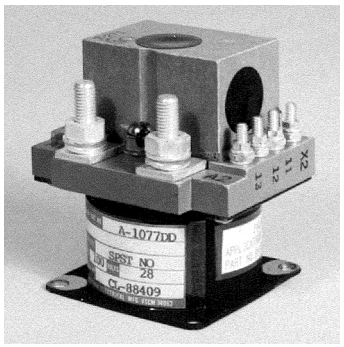
HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
DHR-31BA	Hermetically Sealed	A	Continuous	1	1616098-1

Downloaded from Arrow.com.

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

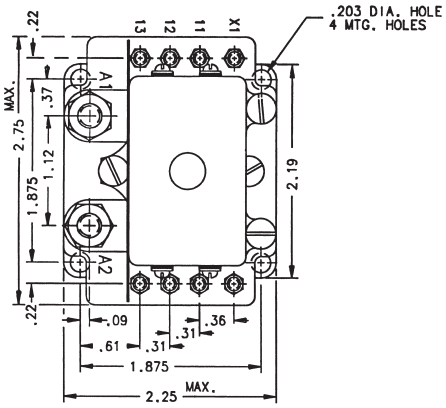
Duty Cycle — Continuous

Operating Voltage, Max. — 32 Vdc

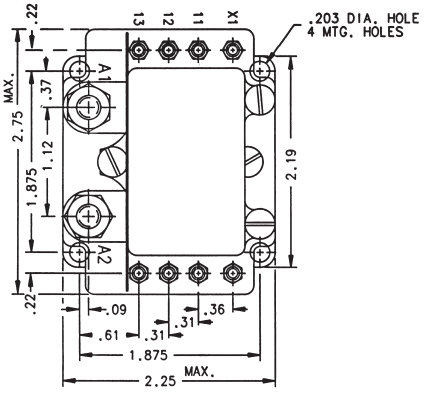
Operating Voltage, Nom. — 24 Vdc

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

Dropout Voltage — 1.0 to 7 Vdc



Mounting Style A

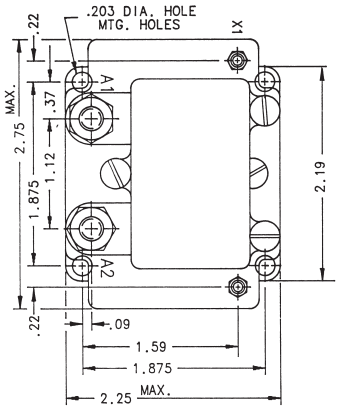


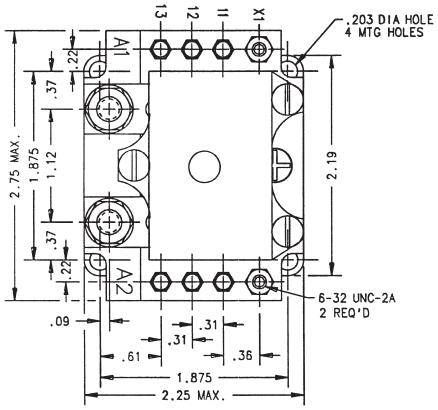
Mounting Style B

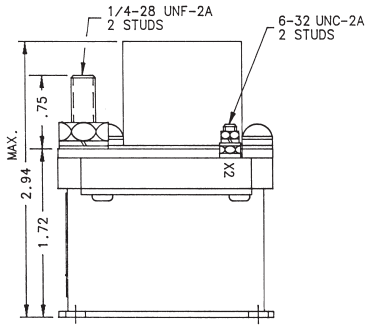
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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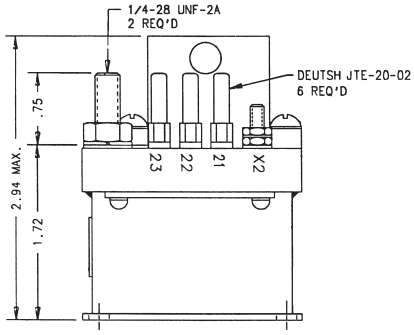
A1077 Series, Rated up to 200 Amps, 28 Vdc (Continued)



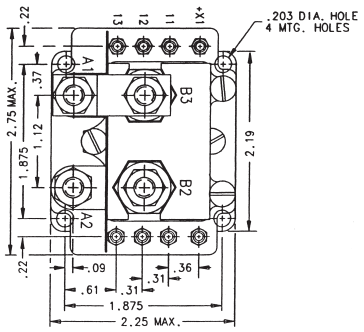


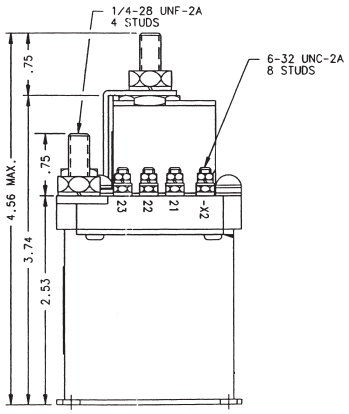


Mounting Style C



Mounting Style D





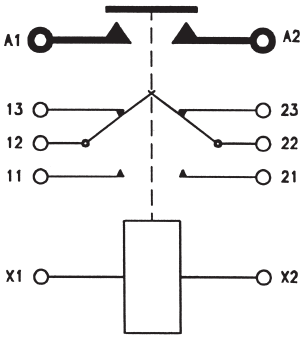
Mounting Style E

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

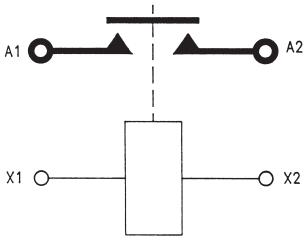
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A1077 Series, Rated up to 200 Amps, 28 Vdc (Continued)

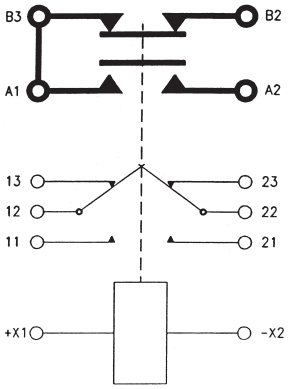
Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 2



Circuit Configuration 3

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

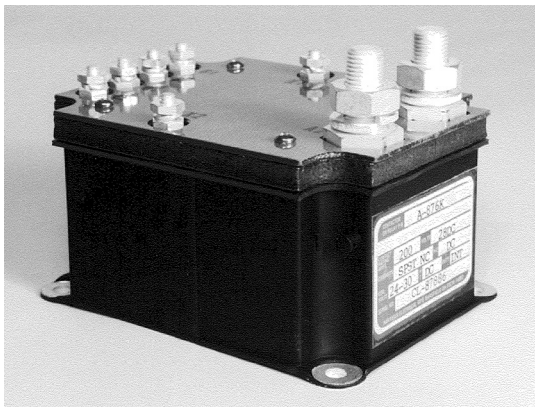
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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A876 Series, Rated up to 200 Amps, 28 Vdc

Product Facts

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



Performance Data

Electrical Characteristics

Main Contacts —

Main Contact Configuration — SPST NC, Double Break

Rated Operating Voltage — 28 Vdc

Resistive Rating — 200 Amps

Inrush, Carry Only — 900 Amps

Auxiliary Contacts —

Aux. Contact Configuration — DPST NO

Voltage, Nom. — 28 Vdc

Resistive Rating — 5 Amps

General Characteristics

Temperature Range — -55°C to +71°C

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

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

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

Weight — 3.00 lbs

Coil Characteristics

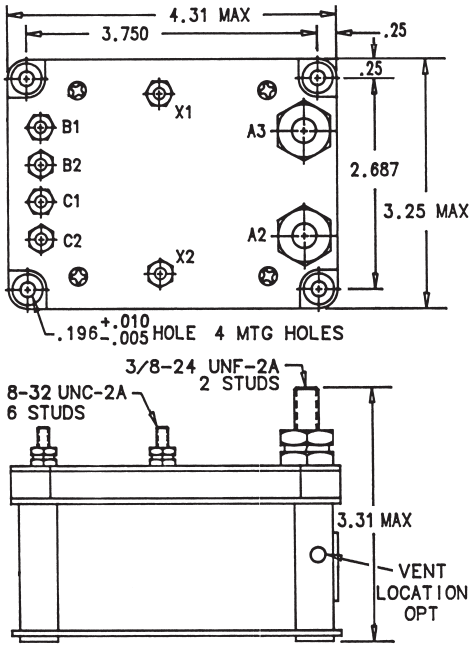
Duty Cycle — Intermittent

Operating Voltage — 24 to 30 Vdc

Pickup Voltage, Max. — 18 Vdc

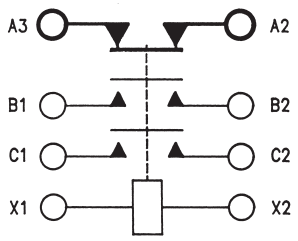
Dropout Voltage — 1 to 7 Vdc

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



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

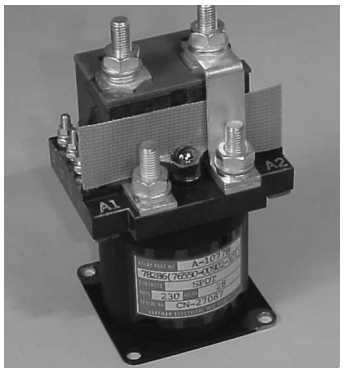
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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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

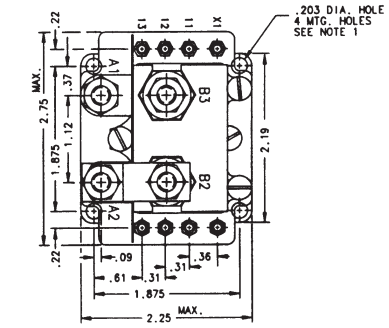
Duty Cycle — Continuous

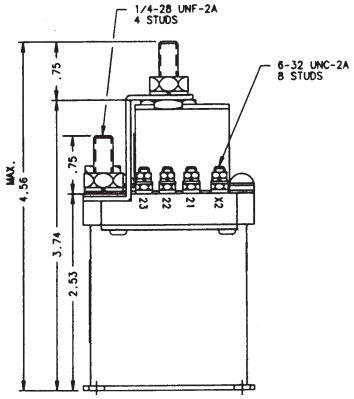
Operating Voltage, Max. — 30 Vdc

Operating Voltage, Nom. — 24 Vdc

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

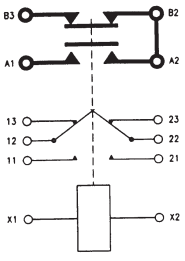
Dropout Voltage — 0.5 to 7 Vdc





Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

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

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

Product Facts

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



Performance Data

Electrical Characteristics

Contact Arrangement — SPST NO, Double Break

Rated Operating Voltage — 28 Vdc

Resistive Rating — 300 Amps

Motor Load — 300 Amps

Rupture Rating — 3,000 Amps

General Characteristics

Temperature Range — -55°C to +71°C

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

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

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

Altitude Max. — 50,000 ft.

Weight — 2.00 lbs

Coil Characteristics

Duty Cycle —
DC Continuous or Intermittent or Continuous or Intermittent with suppression

Operating Voltage, Nom. — 28 Vdc

Pickup Voltage @ 25°C, Max. — 16 Vdc

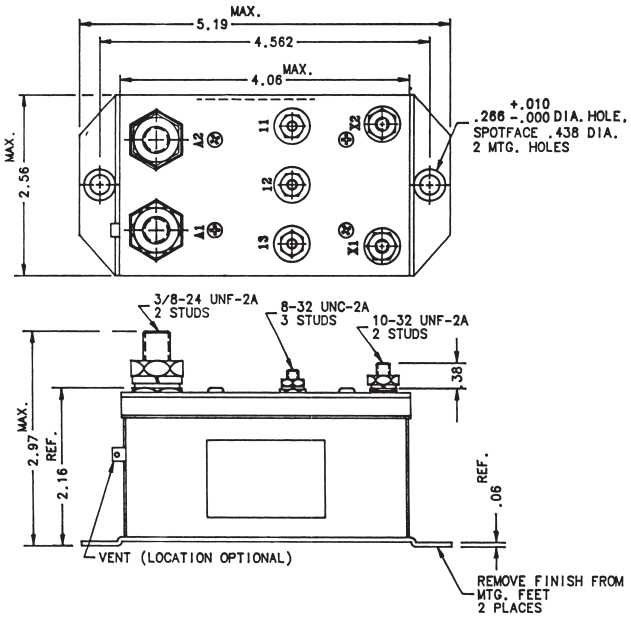
Dropout Voltage @ 25°C — 1.5 to 5 Vdc

Coil Current, Max., Holding —
Coil Type A — 0.4 Amp
Coil Type B — 0.625 Amp

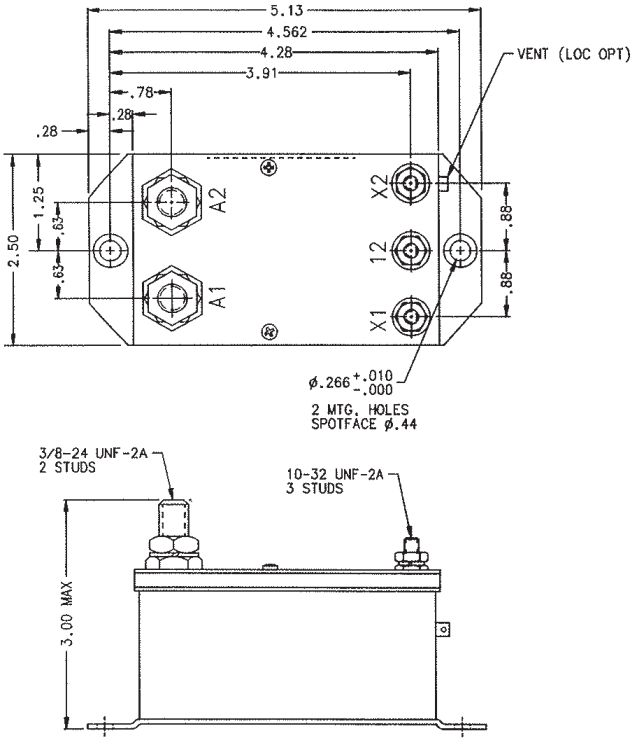
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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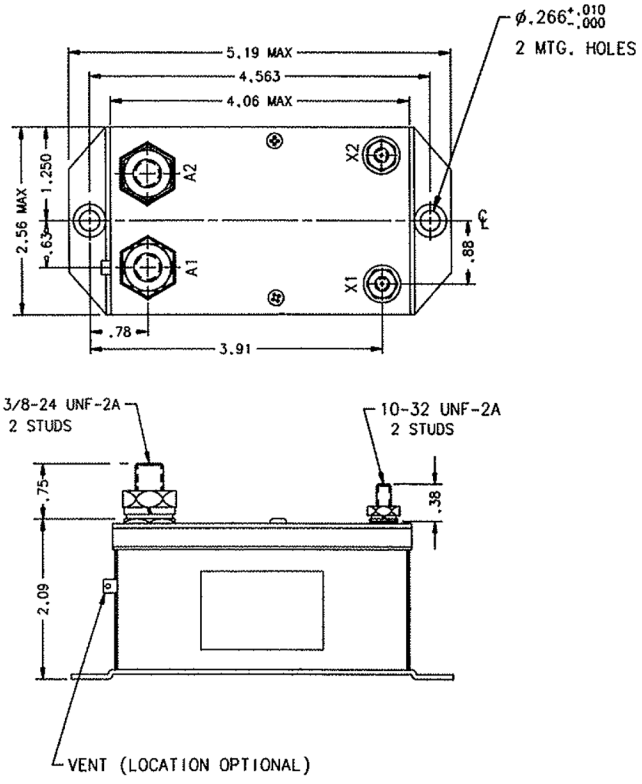
A-770 and AR-770 Series, Rated up to 300 Amps, 28 Vdc (Continued)



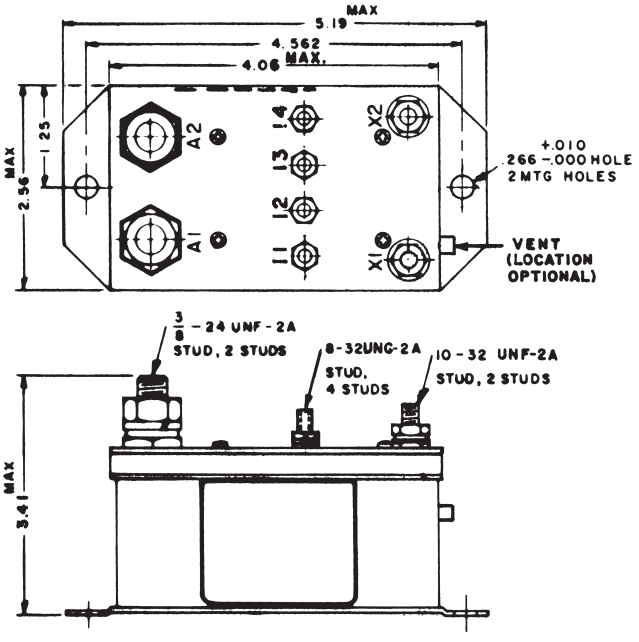
Mounting Style A



Mounting Style B



Mounting Style C

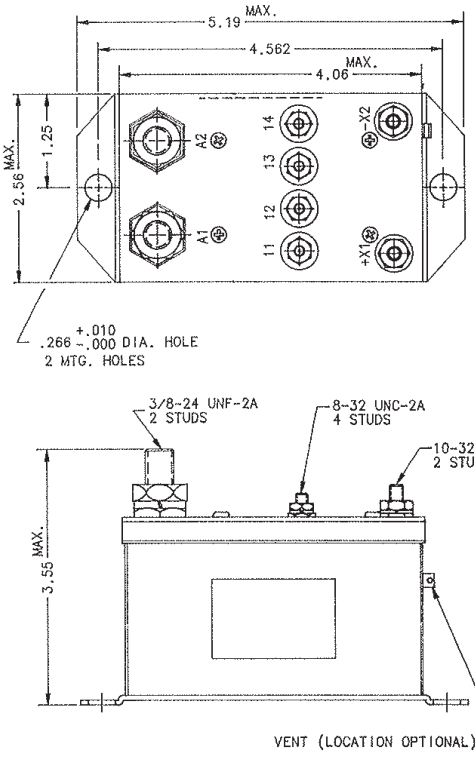


Mounting Style D

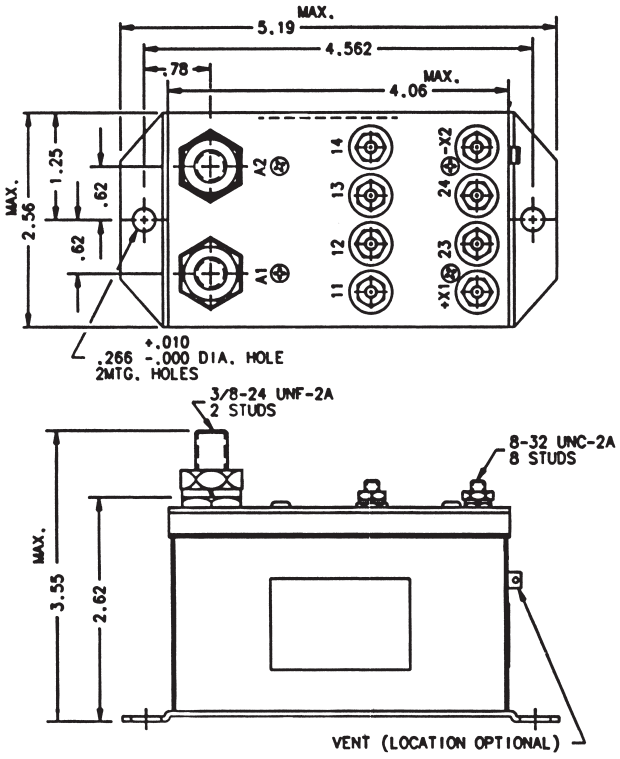
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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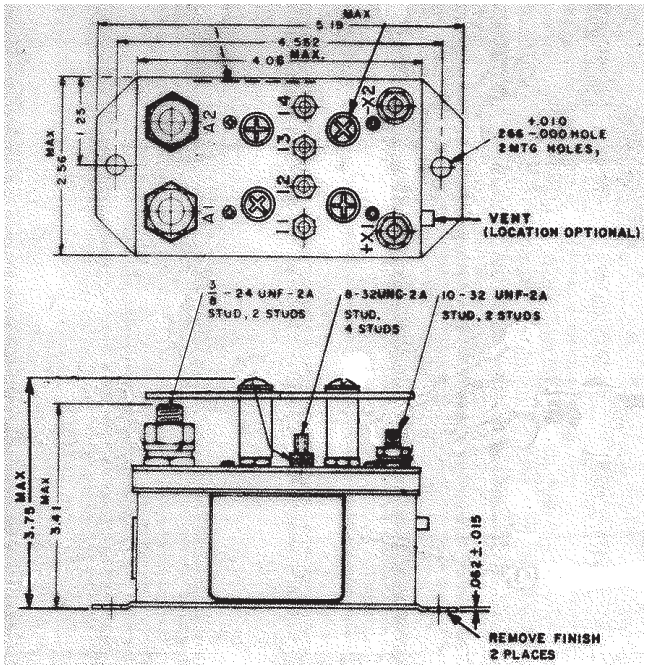
A-770 and AR-770 Series, Rated up to 300 Amps, 28 Vdc (Continued)



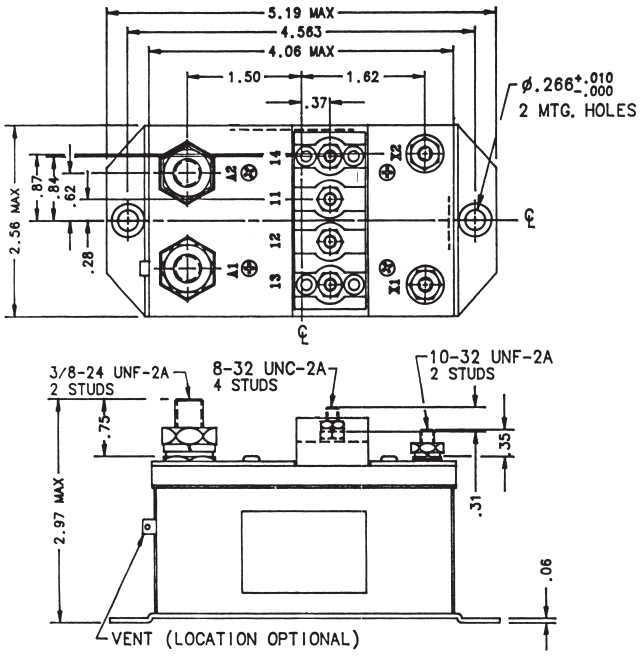
Mounting Style E



Mounting Style F



Mounting Style G

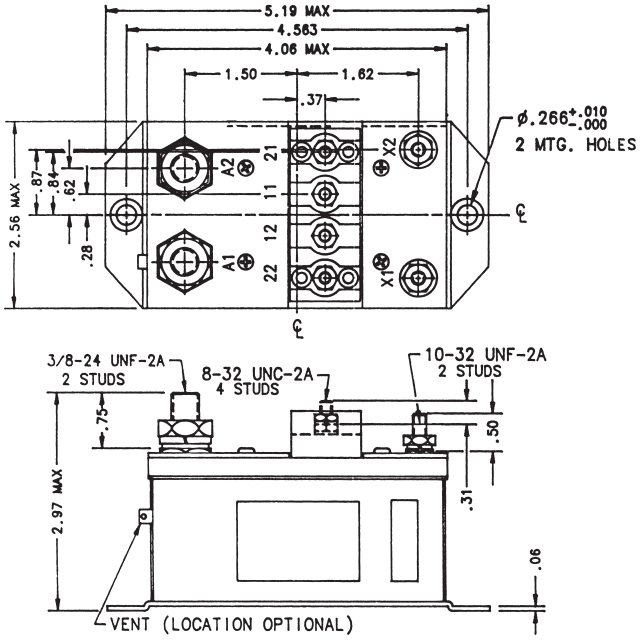


Mounting Style H

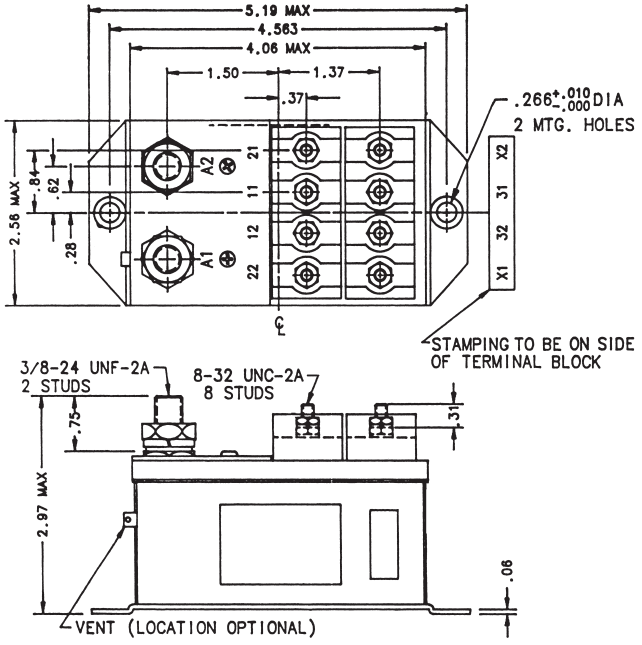
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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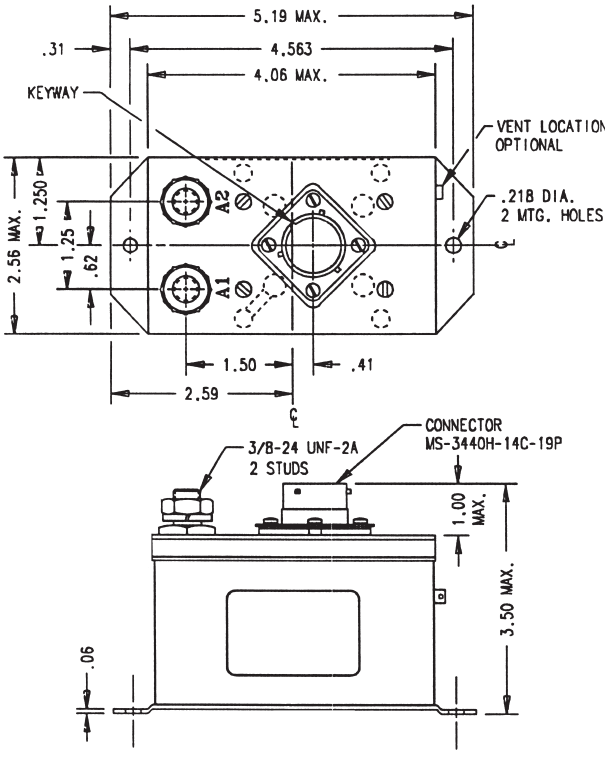
A-770 and AR-770 Series, Rated up to 300 Amps, 28 Vdc (Continued)



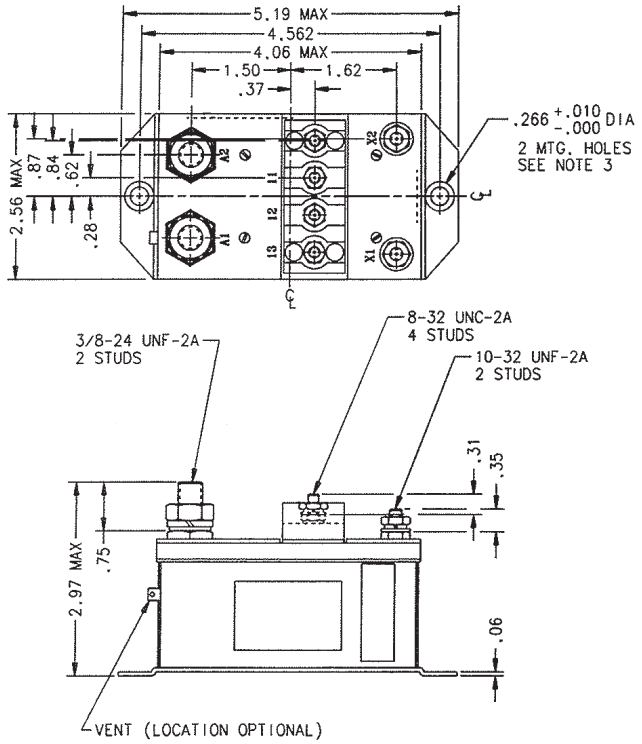
Mounting Style I



Mounting Style J



Mounting Style K



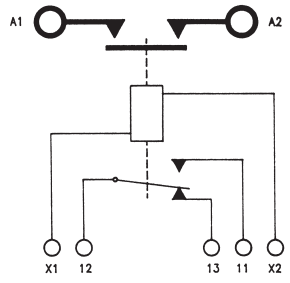
Mounting Style L

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

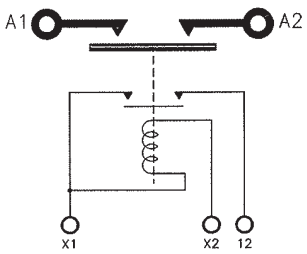
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A-770 and AR-770 Series, Rated up to 300 Amps, 28 Vdc (Continued)

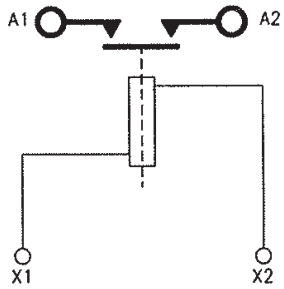
Circuit Configurations (Consult factory for other available circuit configurations)



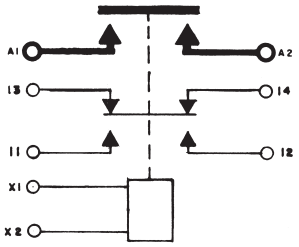
Circuit Configuration 1



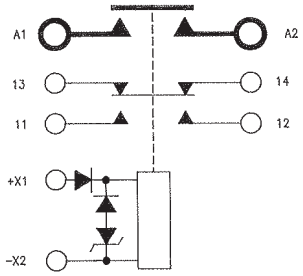
Circuit Configuration 2



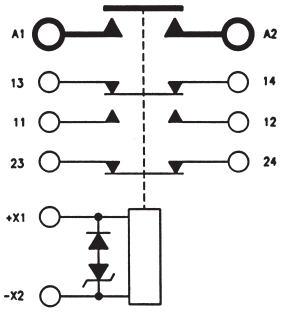
Circuit Configuration 3



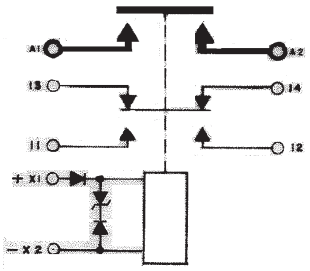
Circuit Configuration 4



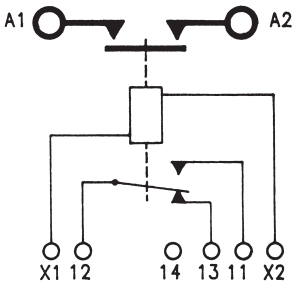
Circuit Configuration 5



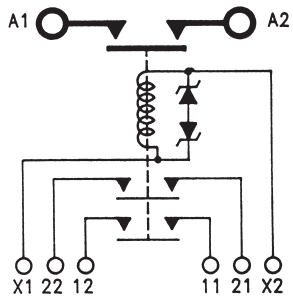
Circuit Configuration 6



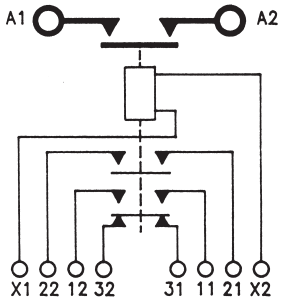
Circuit Configuration 7



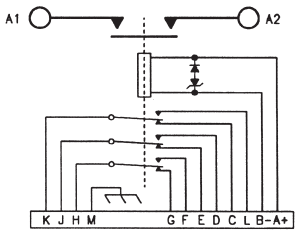
Circuit Configuration 8



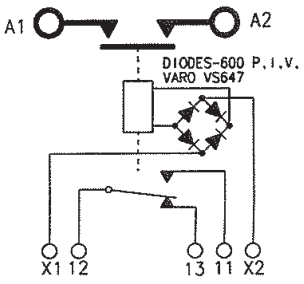
Circuit Configuration 9



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

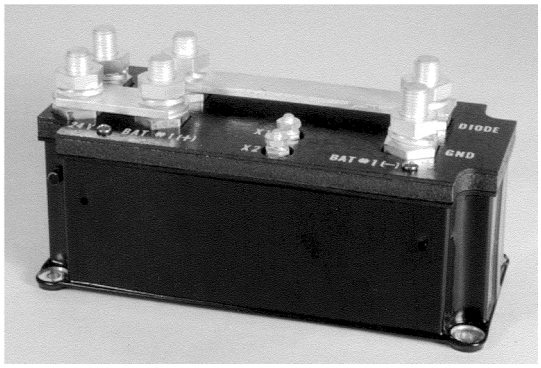
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

Product Facts

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



Performance Data

Electrical Characteristics

Contact Arrangement — SPST NO, DPST NC, Double Break

Rated Operating Voltage — 24/48 Vdc

Resistive Rating — 300 Amps

Inrush for 30 sec — 1,100 Amps

Inrush — 700 Amps

General Characteristics

Temperature Range — -55°C to +71°C

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

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

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

Weight — 3.5 lbs

Coil Characteristics

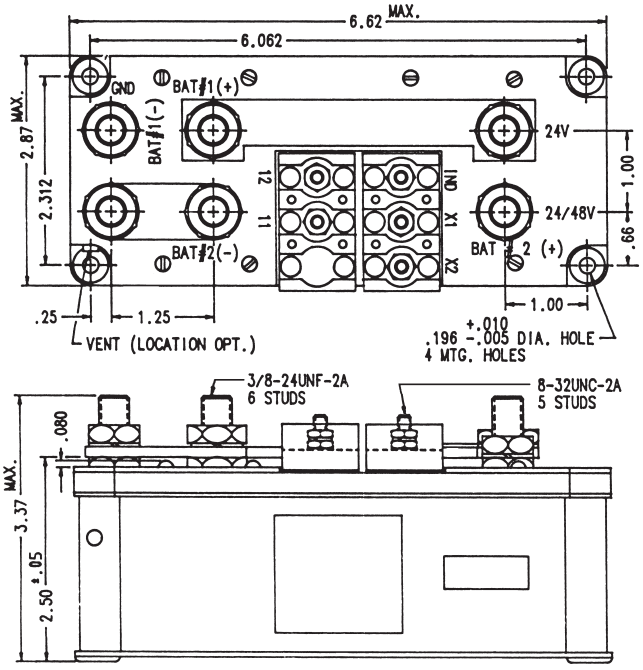
Duty Cycle — Intermittent

Operating Voltage, Max. — 31 Vdc

Operating Voltage, Min. — 18 Vdc

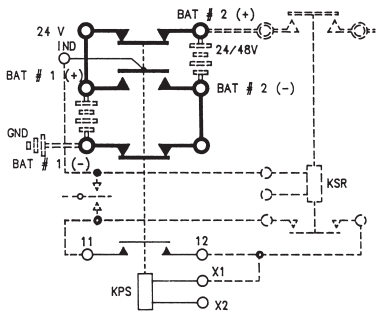
Pickup Voltage @ 25°C, Max., Initial — 12 Vdc

Dropout Voltage — 1.5 to 7 Vdc



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

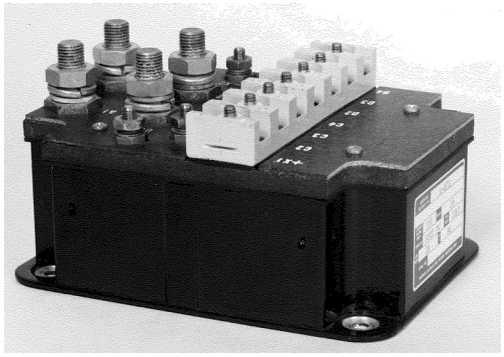
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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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

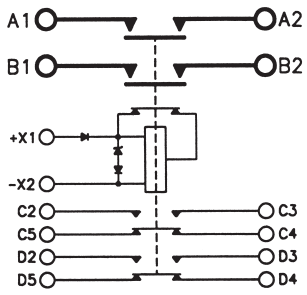
Pickup Voltage, Max. — 18 Vdc

Dropout Voltage — 9 Vdc (12 Vdc Hot)

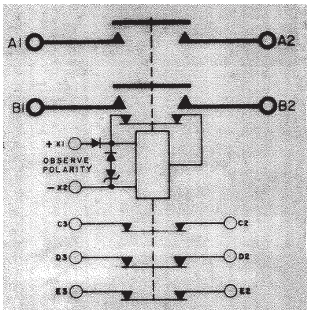
Coil Current, Inrush, Max. — 3.0 Amp

Coil Current, Holding, Max. — 0.35 Amp

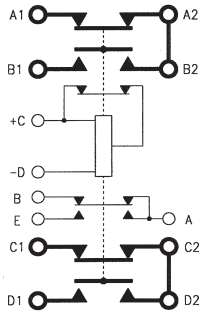
Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 2



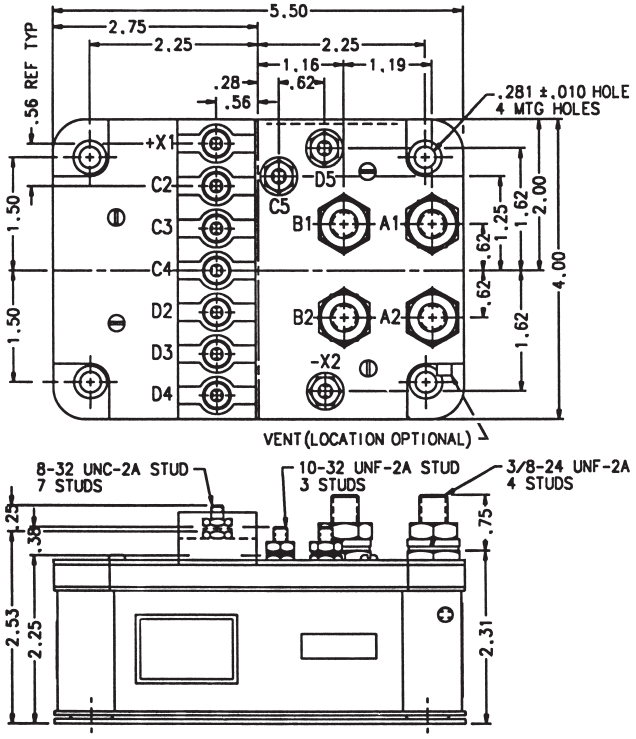
Circuit Configuration 3

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

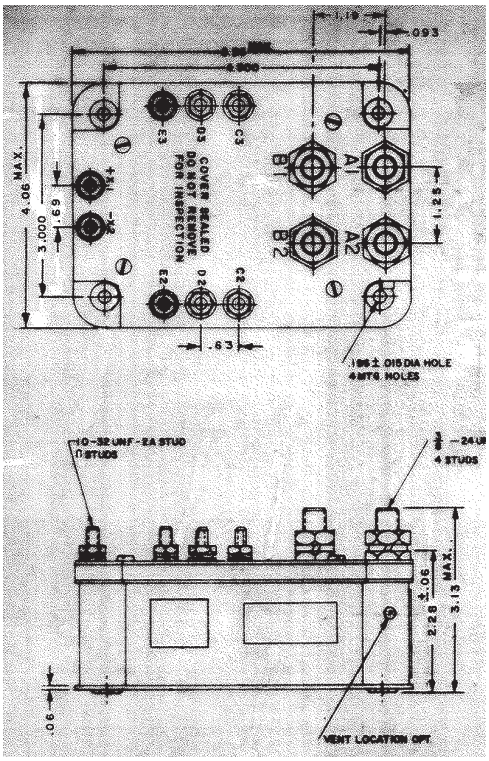
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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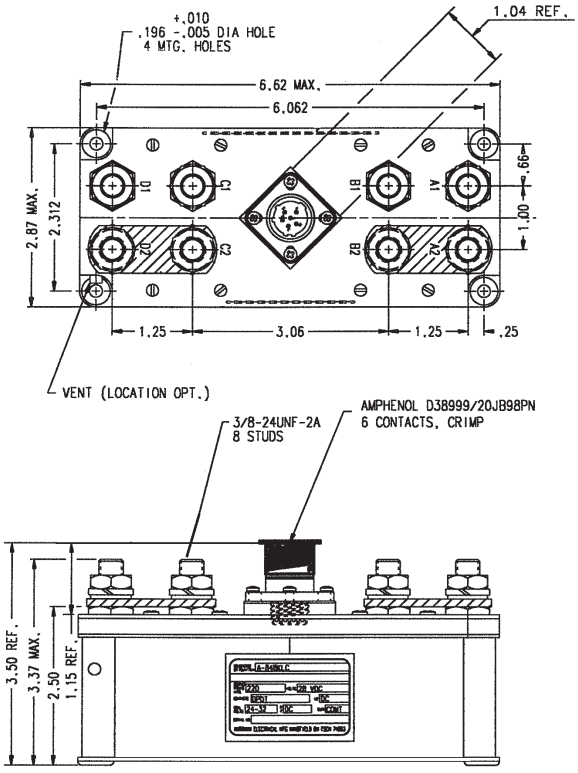
A-848 Series, Rated up to 300 Amps, 28 Vdc (Continued)



Mounting Style A



Mounting Style B



Mounting Style C

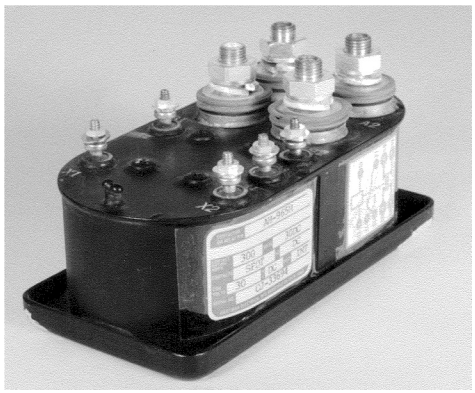
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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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

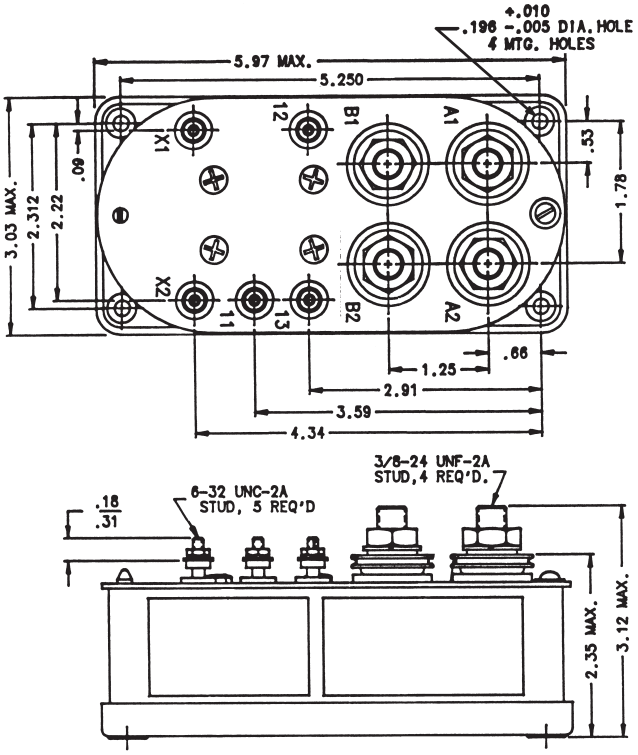
Pickup Voltage, Max. Hot — 20 Vdc

Dropout Voltage — 0.5 to 5 Vdc

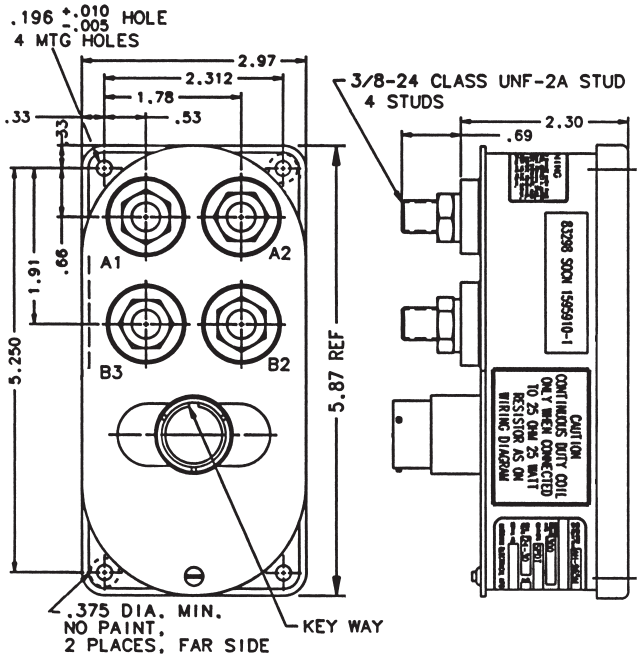
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

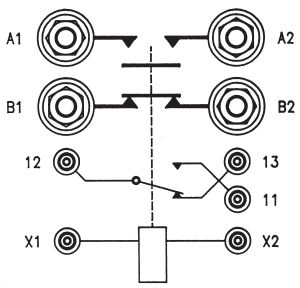


Mounting Style A

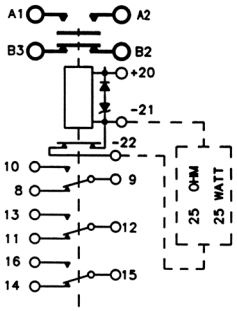


Mounting Style B

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.

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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

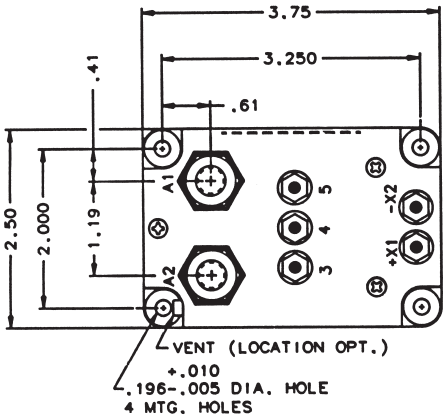
Pickup Voltage, Max. —
A-400A, A-400AA, A-400L — 14 Vdc
A-400B, A-400D, A400DB-1 — 18 Vdc
A-400DC — Normal — 14 Vdc
High Temp. — 18 Vdc
A-400G — Normal — 15 Vdc
High Temp. — 19 Vdc
A-400G-2 — Normal — 10 Vdc
High Temp. — 12.5 Vdc
A-400S — +X to -X2 — 18 Vdc
+Y1 to -Y2 — 13 Vdc

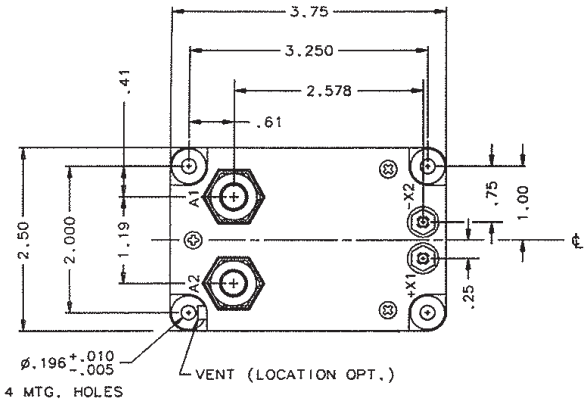
Dropout Voltage —
A-400L — 0.5 to 4 Vdc
A-400A, A-400AA, — 1 to 5 Vdc
A-400B, A-400D, A400DB-1 — 1 to 7 Vdc
A-400DC, A-400G, A-400G-2 — 1.0 Vdc Min.
A-400S — +X to -X2 — 1 to 7 Vdc
+Y1 to -Y2 — 0.5 to 5 Vdc

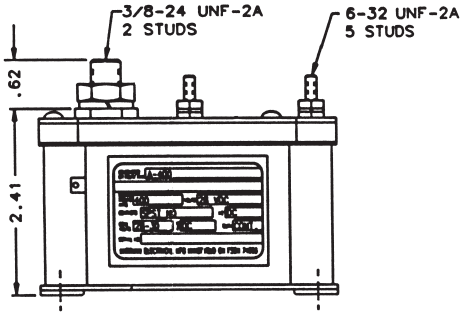
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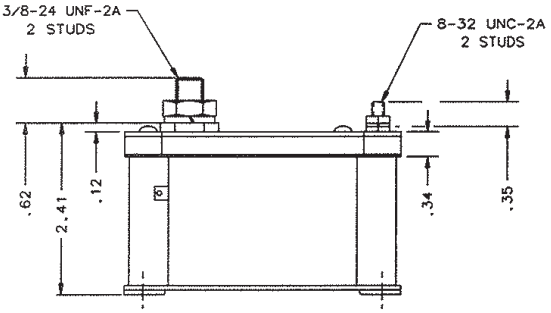
A-400 Series, Rated up to 400 Amps, 28 Vdc (Continued)



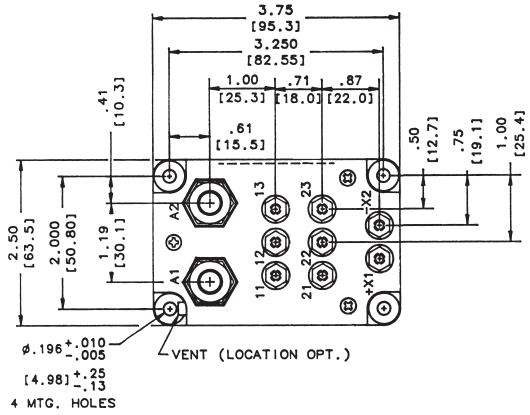


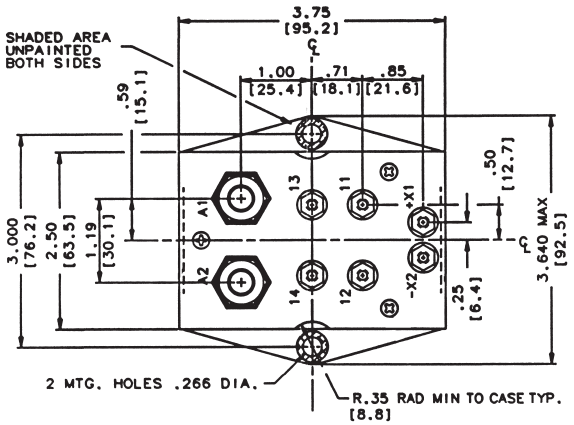


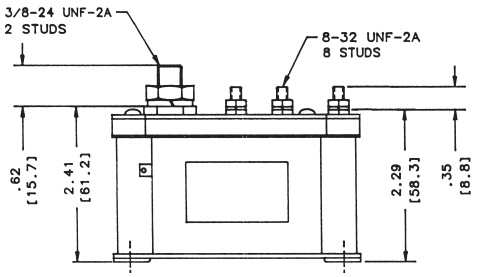
Mounting Style A



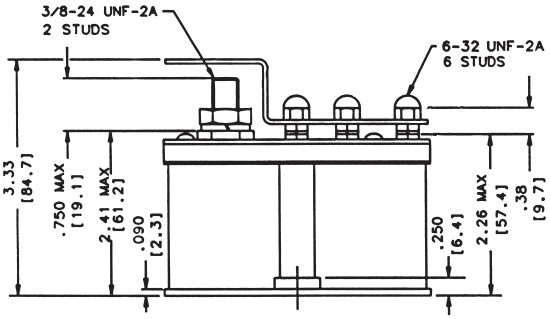
Mounting Style B







Mounting Style C

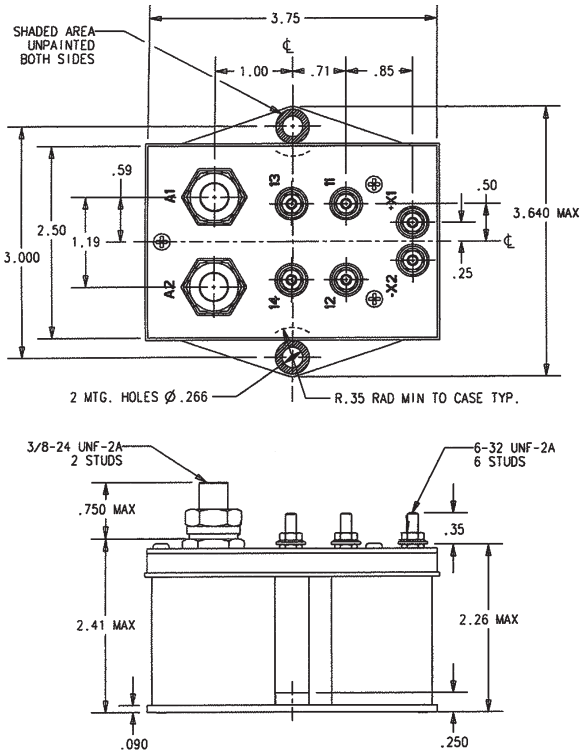


Mounting Style D

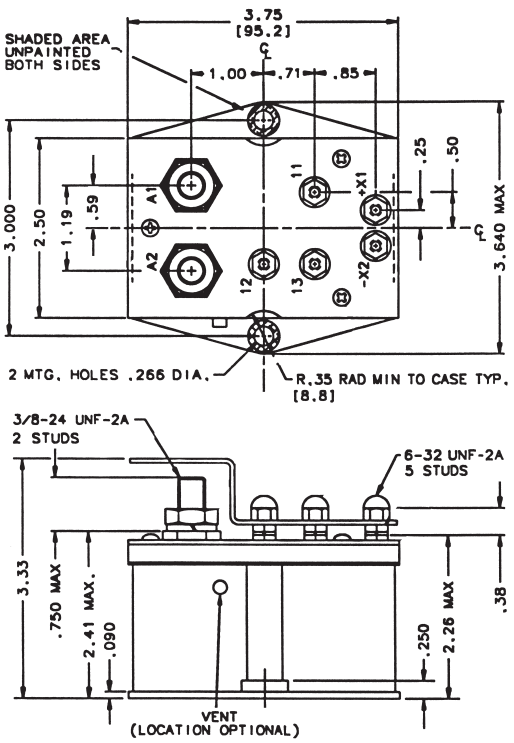
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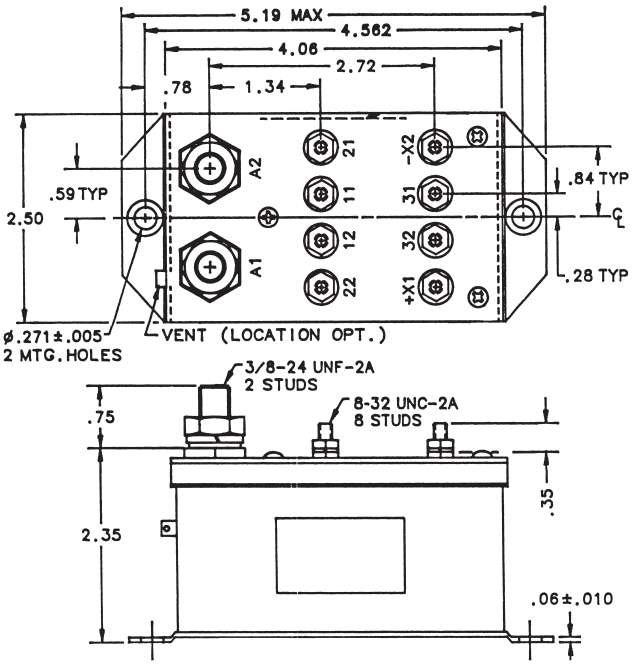
A-400 Series, Rated up to 400 Amps, 28 Vdc (Continued)



Mounting Style E



Mounting Style F

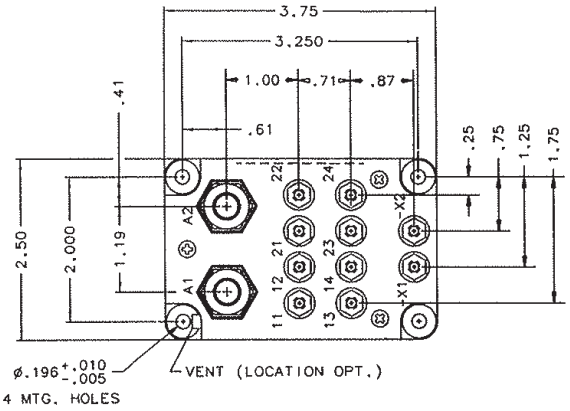


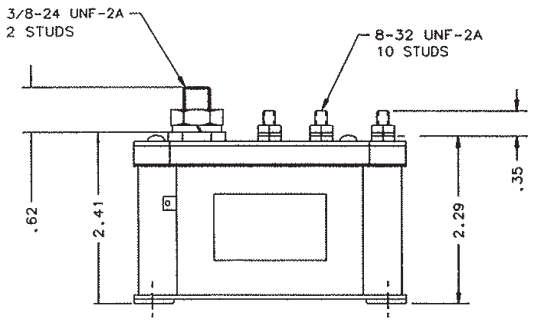
Mounting Style G

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

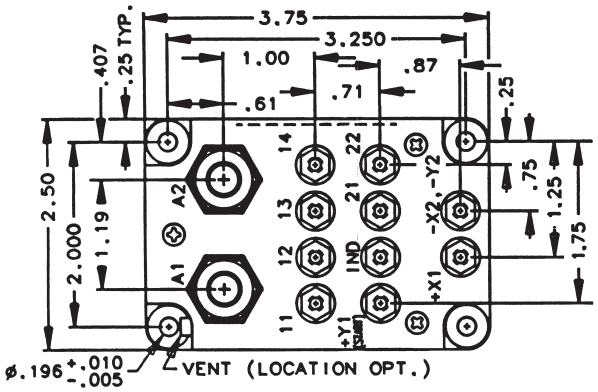
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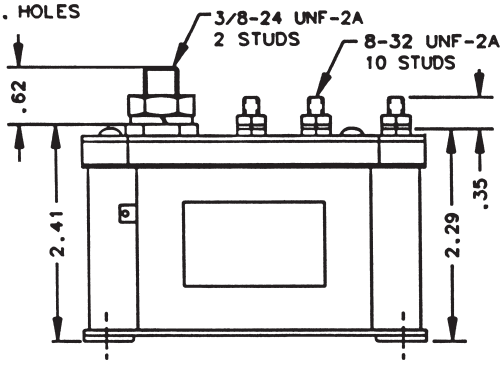
A-400 Series, Rated up to 400 Amps, 28 Vdc (Continued)





Mounting Style I





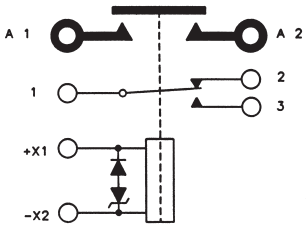
Mounting Style J

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

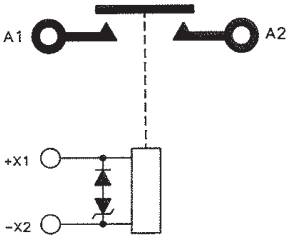
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A-400 Series, Rated up to 400 Amps, 28 Vdc (Continued)

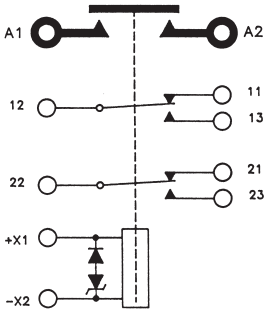
Circuit Configurations (Consult factory for other available circuit configurations)



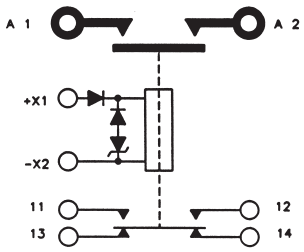
Circuit Configuration 1



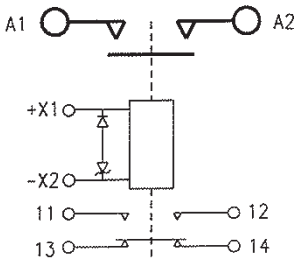
Circuit Configuration 2



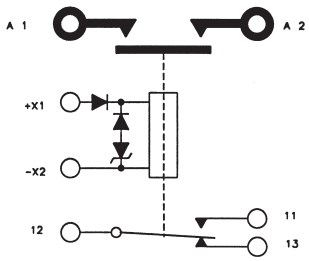
Circuit Configuration 3



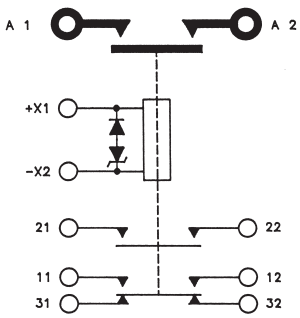
Circuit Configuration 4



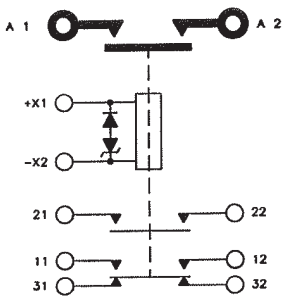
Circuit Configuration 5



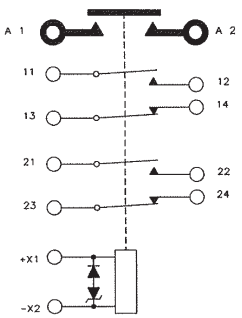
Circuit Configuration 6



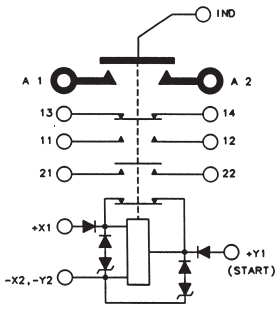
Circuit Configuration 7



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.

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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

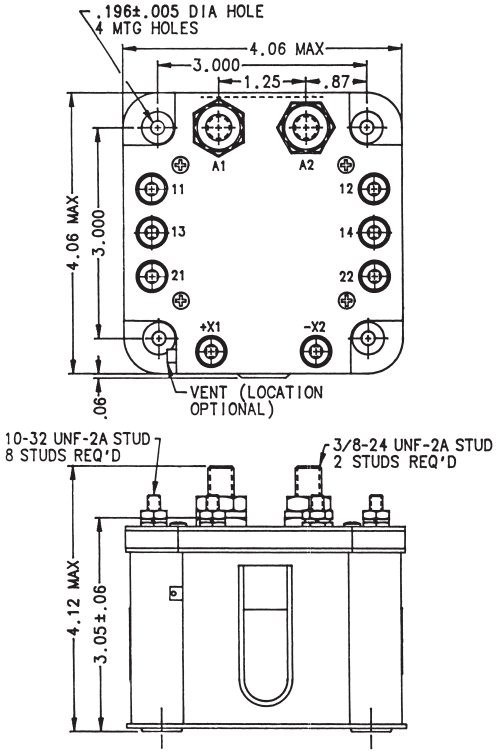
Pickup Voltage @ 25°C, Max. —
A-703B — 8 Vdc
A-703DBH — 10 Vdc
A-703, A-703CD, A-703CSM, A-703D, A-703FA, A-703FB, A-703FSS, A-703ZS — 12 Vdc
A-703T — 13 Vdc
AH-703F, A-703E, A-703G-1, A-703GC, A-703GS, A-703R, AH-703F — 16 Vdc

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

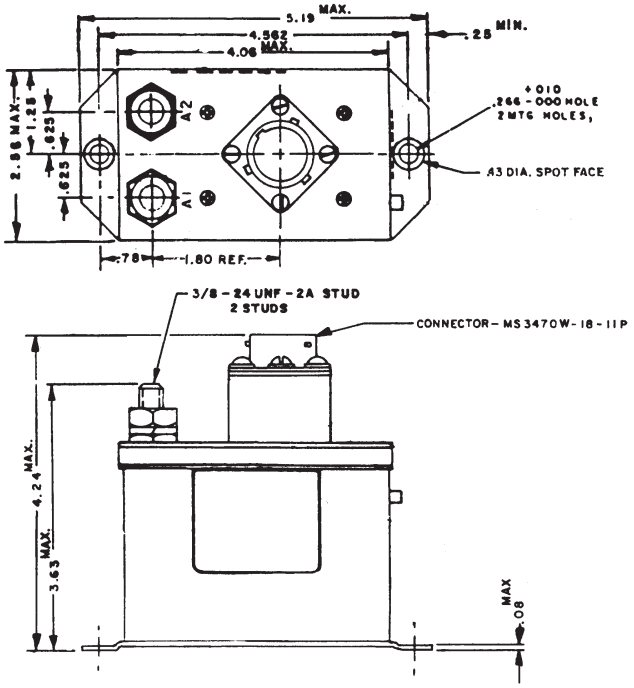
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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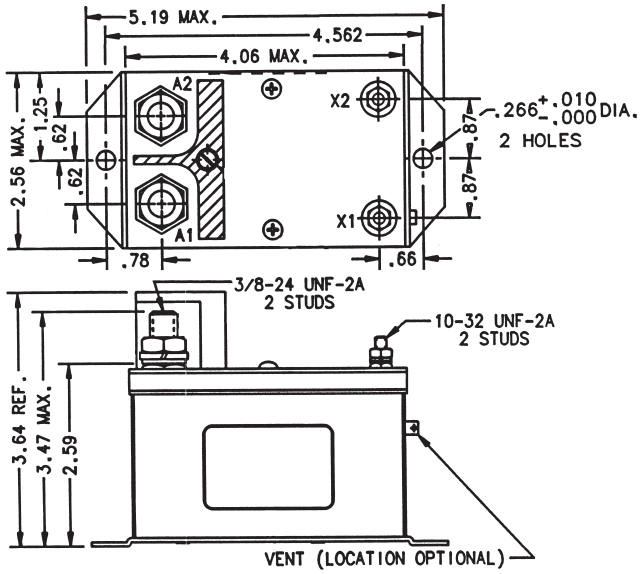
A-703 and AH-703 Series, Rated up to 400 Amps, 28 Vdc (Continued)



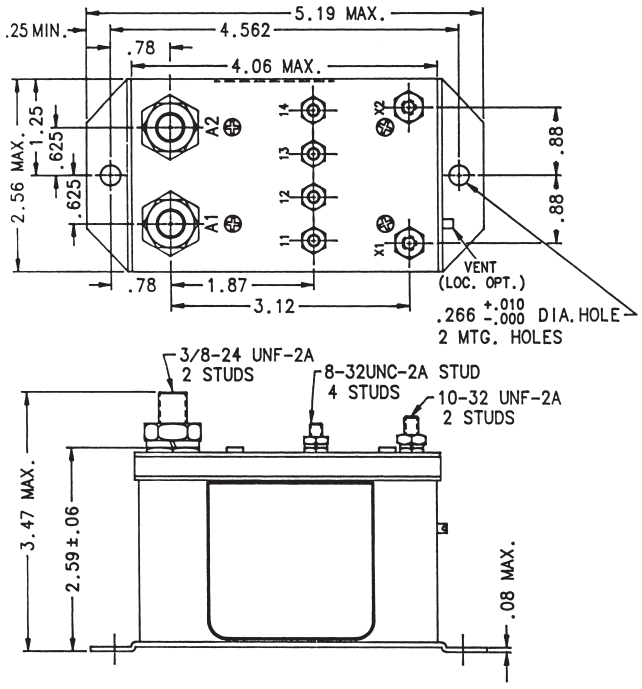
Mounting Style A



Mounting Style B



Mounting Style C

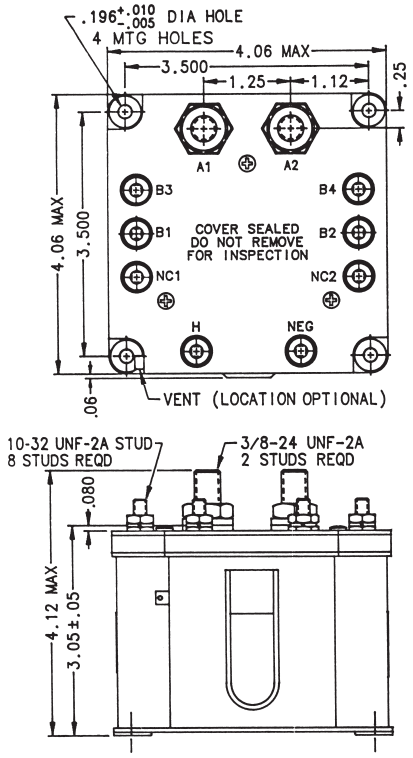


Mounting Style D

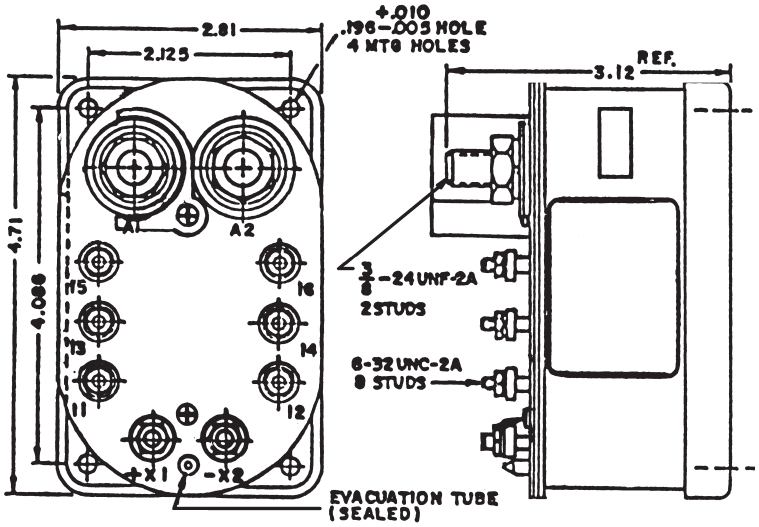
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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



Mounting Style E



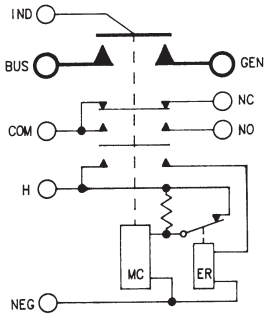
Mounting Style F

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

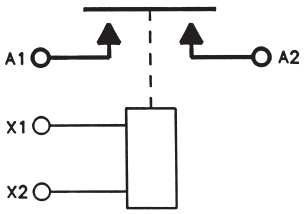
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A-703 and AH-703 Series, Rated up to 400 Amps, 28 Vdc (Continued)

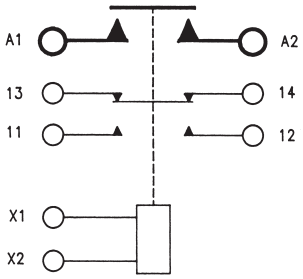
Circuit Configurations (Consult factory for other available circuit configurations)



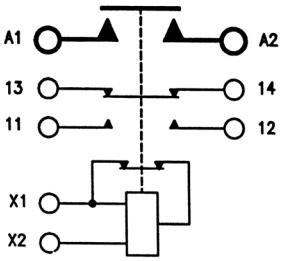
Circuit Configuration 1



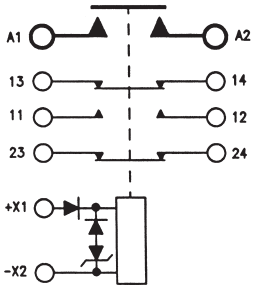
Circuit Configuration 2



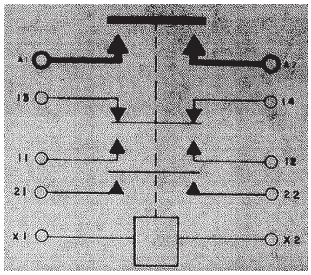
Circuit Configuration 3



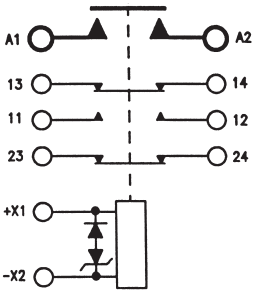
Circuit Configuration 4



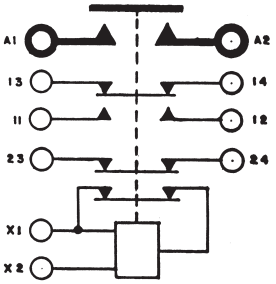
Circuit Configuration 5



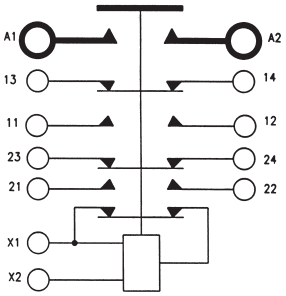
Circuit Configuration 6



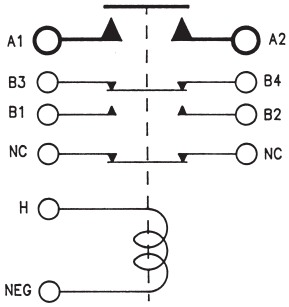
Circuit Configuration 7



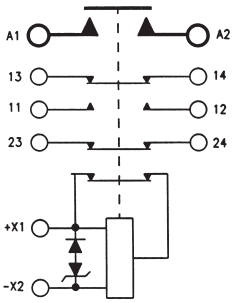
Circuit Configuration 8



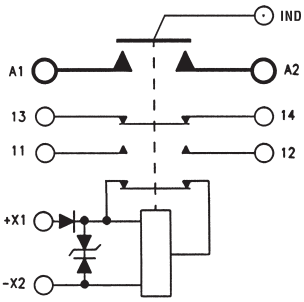
Circuit Configuration 9



Circuit Configuration 10



Circuit Configuration 11



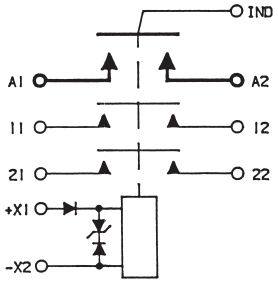
Circuit Configuration 12

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

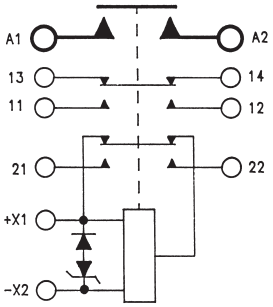
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A-703 and AH-703 Series, Rated up to 400 Amps, 28 Vdc (Continued)

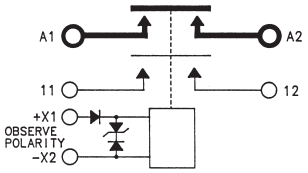
Circuit Configurations (Consult factory for other available circuit configurations)



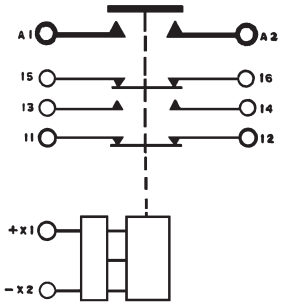
Circuit Configuration 13



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

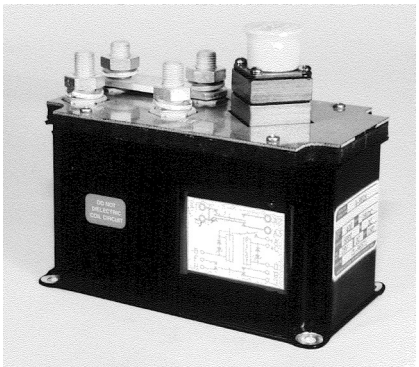
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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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

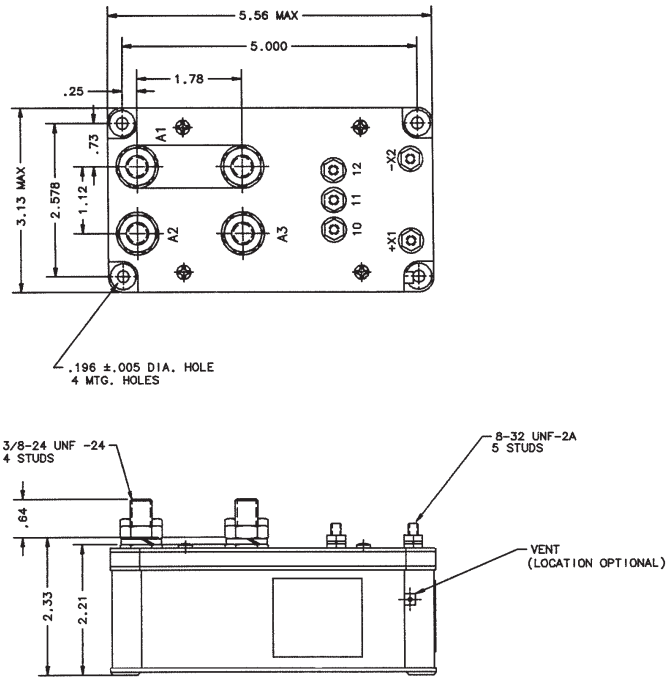
Dropout Voltage @ 25°C — 1 to 10 Volts

Coil Current, Inrush, Max. — 4.5 Amp

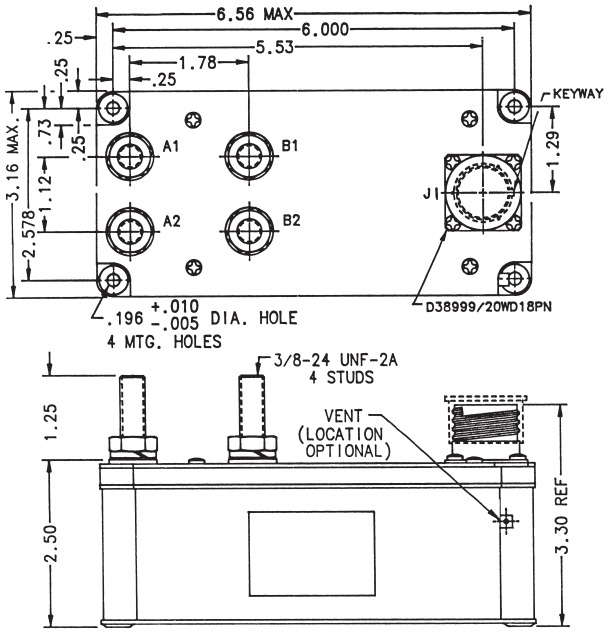
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

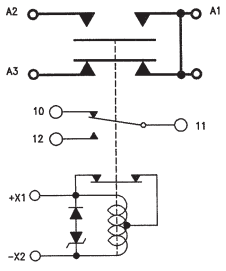


Mounting Style A

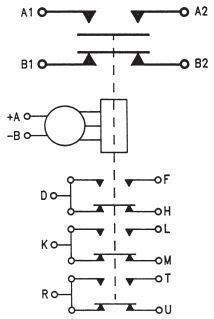


Mounting Style B

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.

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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

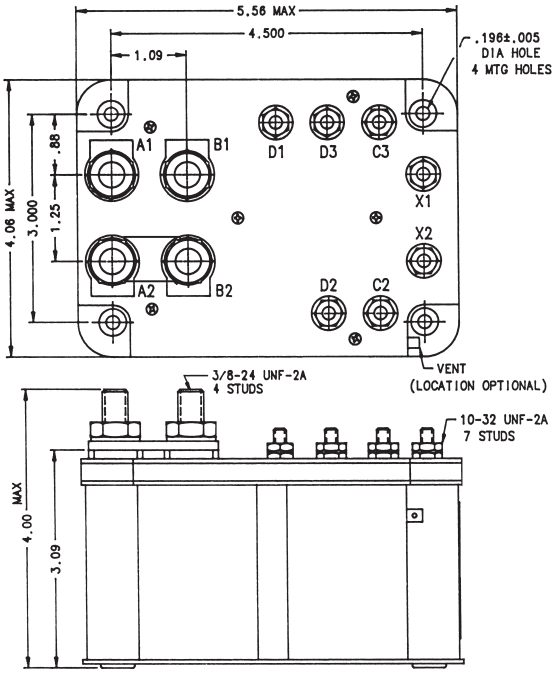
Duty Cycle — Continuous, economizing

Operating Voltage, Nom. — 35-39 Vdc

Pickup Voltage @ 25°C, Max. — 20 V

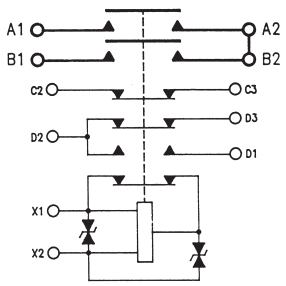
Resistance @ 25°C —
Pickup — 27 Ohm ± 20%
Hold — 111 Ohm ± 20%

Suppression, Peak, Max. — 50 V



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

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

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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

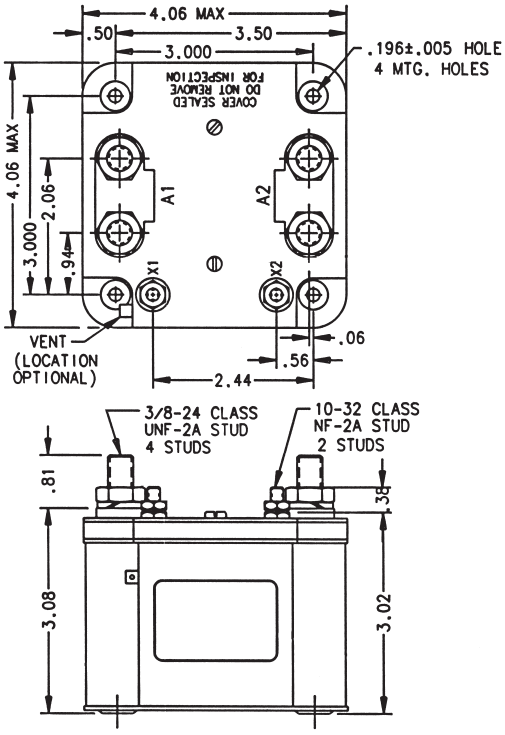
Operating Voltage, Max. — 29 Vdc

Coil Voltage, Nom. — 24-28 Vdc

Pickup Voltage, Max. — 18 Vdc

Dropout Voltage — 1 to 5 Vdc

Coil Current, Hold, Max. — 0.6 Amp

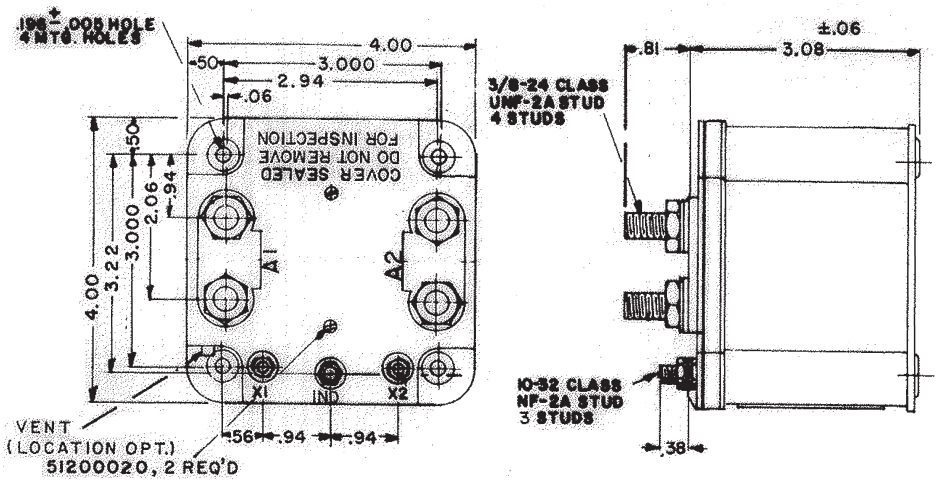


Mounting Style A

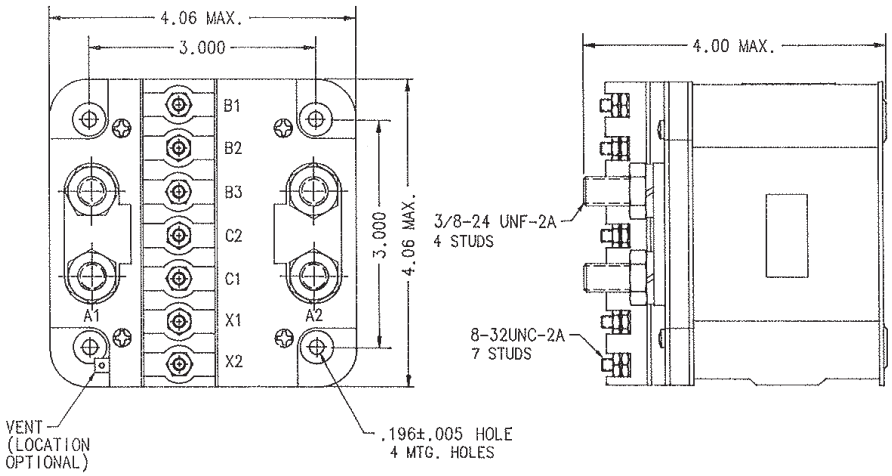
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

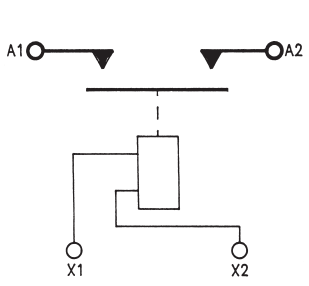


Mounting Style B

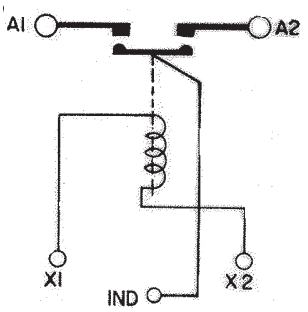


Mounting Style C

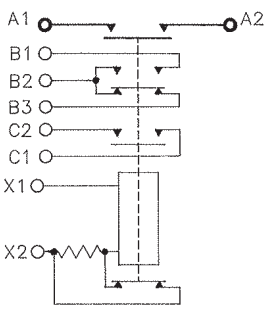
Circuit Configurations (Consult factory for other available circuit configurations)



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

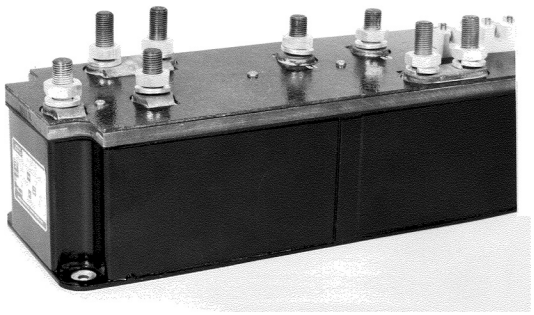
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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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

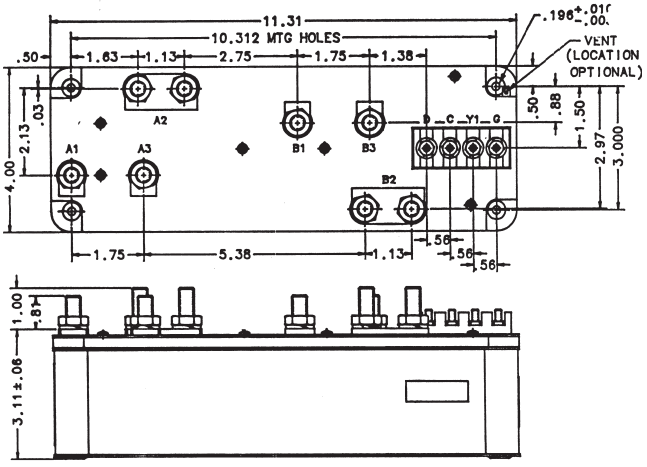
Operating Voltage, Min. — 18 Vdc

Pickup Voltage, Max., Hot — 18 Vdc

Dropout Voltage, Max., Hot — 7 Vdc

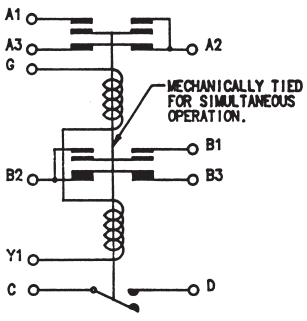
Coil Current, Max. @ 70°F — 8 Amps

Coil Current, Max. @ -65°F — 9.6 Amps



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

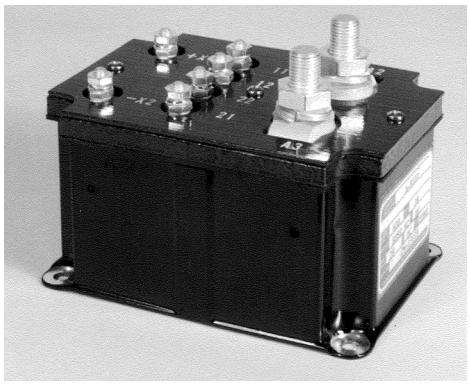
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

Product Facts

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



Performance Data

Electrical Characteristics

Main Contacts —

Contact Arrangement — SPST NC, Double Break

Rated Operating Voltage — 28 Vdc

Resistive Rating — 600 Amps

Inrush for 30 sec — 1,000 Amps

Inrush for 5 min — 800 Amps

Auxiliary Contacts —

Aux. Contact Arrangement — DPST

Rated Operating Voltage — 28 Vdc

Resistive Rating — 5 Amps

General Characteristics

Temperature Range — -55°C to +71°C

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

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

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

Weight, Max. — 3.00 lbs

Coil Characteristics

Duty Cycle — Continuous, economizing

Operating Voltage, Max. — 30 Vdc

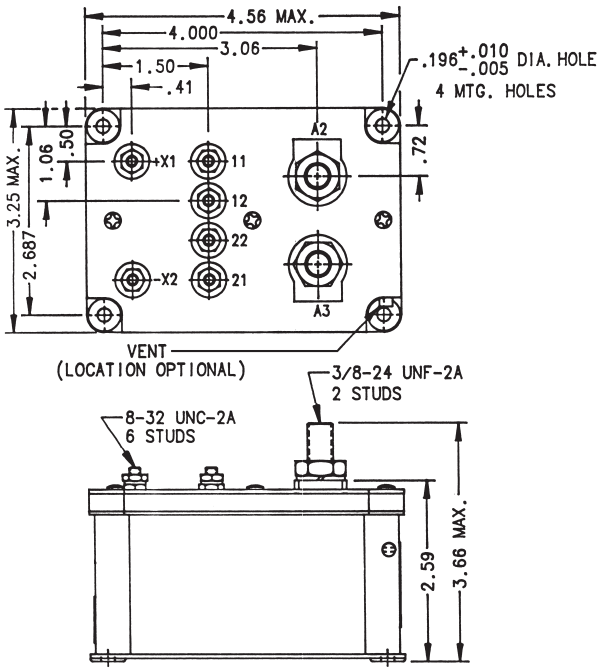
Operating Voltage, Min. — 18 Vdc

Pickup Voltage, Initial, Max. @ 71°C — 10 Vdc

Dropout Voltage — 1 to 7 Vdc

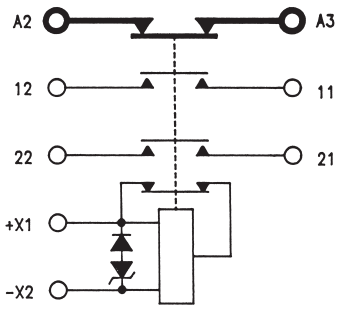
Resistance, Inrush ± 20% @ 25°C — 3 Ohm

Resistance, Hold ± 20% @ 25°C — 80 Ohm



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

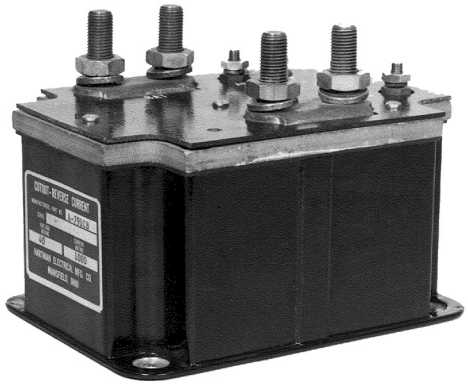
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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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

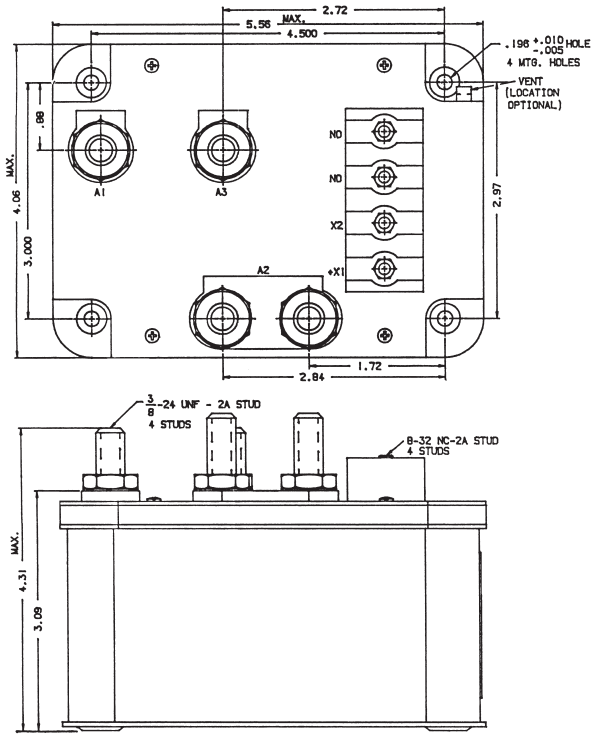
Coil Characteristics

Duty Cycle —
A-981E — Continuous
A-981K — Continuous, economizing

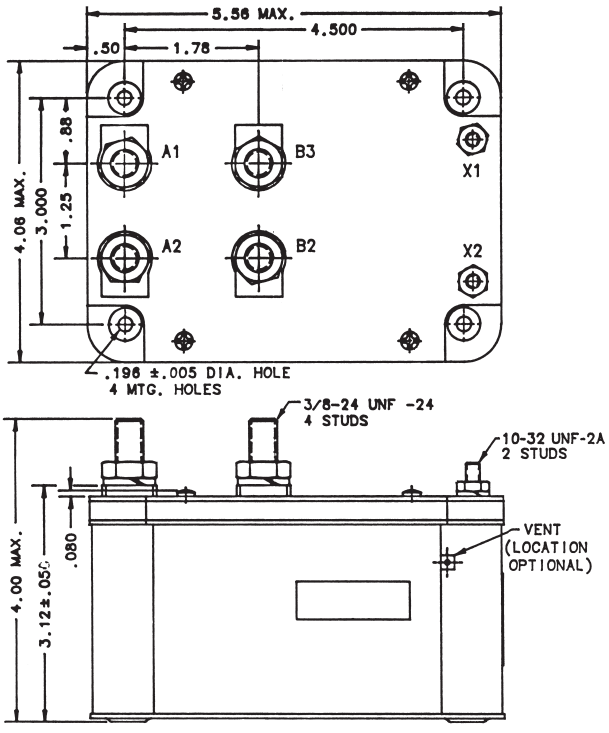
Operating Voltage —
A-981E — 28 Vdc
A-981K — 24 Vdc min. to 30 Vdc max.

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



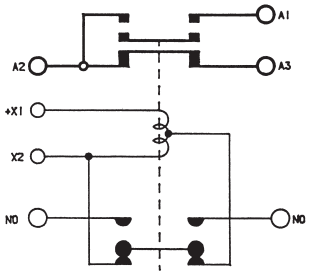
Mounting Style B

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

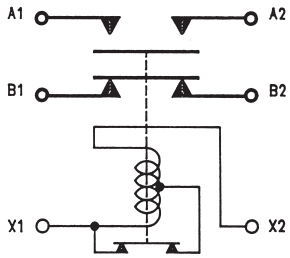
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A-981 Series, Rated up to 600 Amps, 28/48 Vdc (Continued)

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.

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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 S{DT 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.

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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.
		24/48	DPDT NC SPDT NO	Side Stable	SPST NO	24-30	Gasket/Vented	Int.	–	A-848KH	1616082-2
300	DC	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
		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
300	DC	30	SPDT	Side Stable	SPDT	30	Hermetic	Int.	–	AH-965H	1616084-1
		30	SPDT	Side Stable	3PDT	28	Hermetic	Cont.	45	AH-965M	1616084-2
		28	SPST NO	Side Stable	SPDT	28	Gasket/Vented	Int.	45	A-400A	1-1616530-6
		28	SPST NO	Side Stable	–	28	Gasket/Vented	Int.	45	A-400AA	1616056-2
		28	SPST NO	Side Stable	DPDT	28	Gasket/Vented	Cont.	45	A-400B	1616056-4
		28	SPST NO	Side Stable	(1)SPST NO (1)SPST NC	28	Environ.	Cont.	45	A-400D	1616056-5
		28	SPST NO	Side Stable	(1)SPST NO (1)SPST NC	28	Environ.	Cont.	45	A-400DB1	1-1616964-3
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
		28	SPST NO	Side Stable	DPST NO DPST NC	28	Gasket/Vented	Int.	45	A-400L	1-1616530-5
		28	SPST NO	Side Stable	DPST NO SPST NC	28	Gasket/Vented	Cont/Int	45	A-400S	1616056-9
		28	SPST NO	Side Stable	SPDT	24-30	Gasket/Vented	Cont. Econ.	–	A-703	1616058-1
		28	SPST NO	Side Stable	–	24-30	Gasket/Vented	Int.	–	A-703CD	1616058-6
		36/40	SPST NO	Side Stable	SPST NO	24-30	Gasket/Vented	Int.	50	A-703CSM	1616058-7
		28	SPST NO	Side Stable	Form Z	24-30	Gasket/Vented	Int.	–	A-703D	1616058-8
		28	SPST NO	Side Stable	Form Z	18-31	Gasket/Vented	Int.	–	A-703DBH	1-1616058-0
		28	SPST NO	Side Stable	Form Z	24-30	Gasket/Vented	Cont. Econ.	–	A-703E	1-1616058-1
		28	SPST NO	Side Stable	Form Z SPST NC	24-30	Gasket/Vented	Int.	45	A-703FA	1-1616058-2
		28	SPST NO	Side Stable	Form Z SPST NC	24-30	Gasket/Vented	Int.	–	A-703FB	1-1616058-3
		28	SPST NO	Side Stable	Form Z SPST NC	24-30	Gasket/Vented	Int.	45	A-703FSS	1-1616058-4
400	DC	28	SPST NO	Side Stable	Form Z SPST NC	18-31	Gasket/Vented	Cont. Econ.	–	A-703G-1	1-1616058-5
		28	SPST NO	Side Stable	Form Z SPDT 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
		28	SPST NO	Side Stable	Form Z	24-30	Gasket/Vented	Cont. Econ.	45	A-703R	1-1616058-9
		28	SPST NO	Side Stable	SPST NO SPST NC	24-30	Gasket/Vented	Int.	45	A-703T	2-1616058-0
		28	SPST NO	Side Stable	SPST NO Form Z	18-24	Gasket/Vented	Cont. Econ.	45	A-703ZS	1-1616058-2
		28	SPST NO	Side Stable	1Form Z 1Form Y	18-31	Hermetic	Cont. Econ.	–	AH-703F	1616061-1

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

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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.

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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

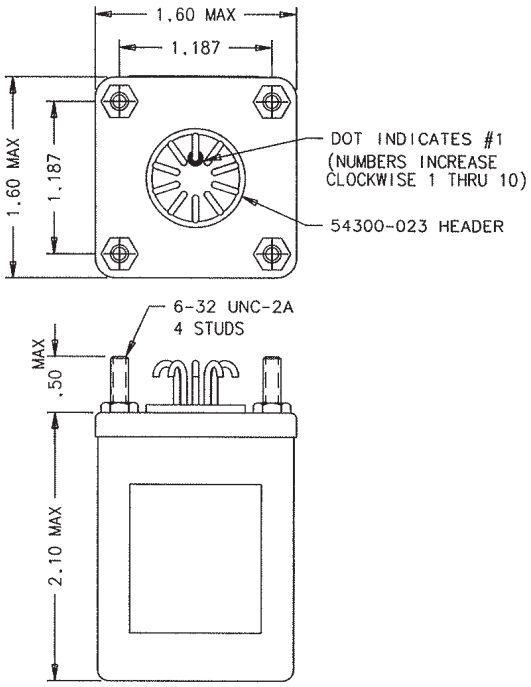
General Characteristics

Temperature Range — -55°C to +85°C

Operating Cycles (Life)

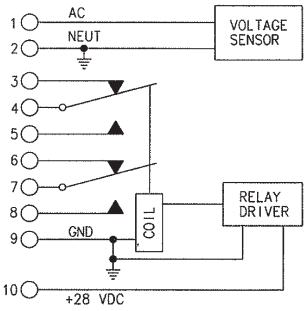
Mechanical, Min. — 100,000 cycles

Weight,Max. – 6 oz.



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

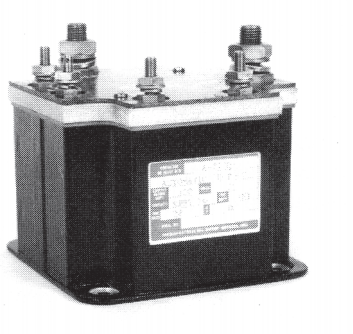
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

Downloaded from Arrow.com.

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

Product Facts

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



Performance Data

Electrical Characteristics

Main Contacts —

Contact Arrangement — SPST NO

Rated Operating Voltage — 28 Vdc

Resistive Rating — 200 Amps

Auxiliary Contacts —

Aux. Contact Arrangement — SPST NC

Rated Operating Voltage — 28 Vdc

Resistive Rating — 5 Amps

General Characteristics

Temperature Range — -55°C to +71°C

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

Operating Cycles (Life) Mechanical — 100,000 cycles

Electrical— 50,000 min.

Weight, Max. — 2 lbs. 13 oz.

Coil Characteristics

Duty Cycle — Continuous

Operating Voltage, Max. — 30 V

Operating Voltage, Min. — 24 V

Pickup Voltage @ 25°C, Max. — 16 V

Dropout Voltage — 1 to 7 V

Overload Sensor

Type — Latching

Polarized — Discharge

Trip — 300 Amps ± 10%

Time Delay — 900 to 1,100 msec

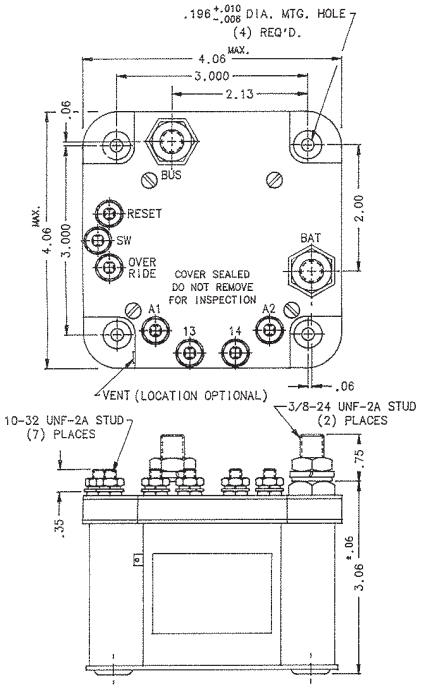
Sensor Contacts, Aux.

Sensor Contact Arrangement — SPST NO

Rated Operating Voltage — 28 Vdc

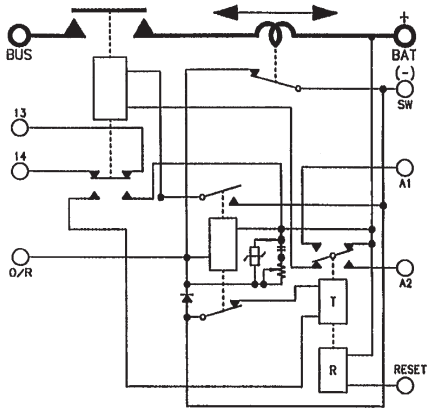
Resistive Rating — 3 Amps

Reset Rating, Max. — 18 V



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

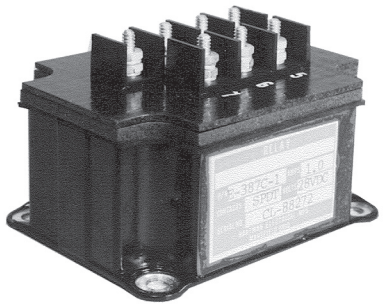
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

Downloaded from Arrow.com.

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

Product Facts

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



Performance Data

Electrical Characteristics

Indicator Contact Arrangement — SPDT

Rated Operating Voltage — 28 Vdc

Resistive Rating — 1 Amp

General Characteristics

Dielectric Strength — 1,000 Vrms, 60 Hz

Insulation Resistance @ 500 Vdc & 20°C & 50% R.H. (Max.)— 1,000 megohm min.

Weight, Max. — 8 oz

Coil Characteristics

Duty Cycle — Continuous

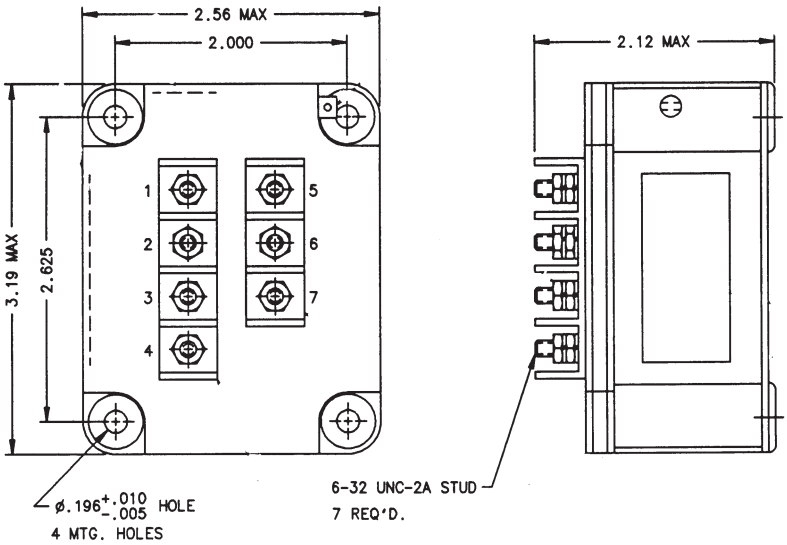
Control Power — 28 Vdc

Sensor Input — 400 Hz ± 100 Hz

Pickup Current — 14 ± 2 Amps

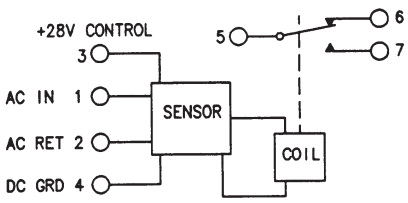
Dropout Current — 7 ± 1 Amp

Continuous Sensor Current — 25 Amp, max.



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

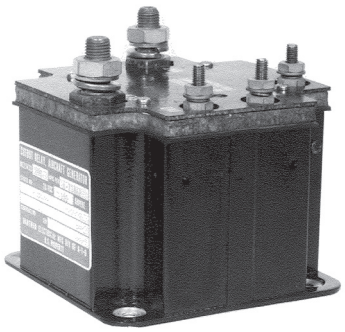
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

Downloaded from Arrow.com.

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 ± .15 V
Auxiliary Contacts —
Aux. Contact Arrangement — SPST NC, SPST NO
Resistive Rating — 5 Amps
Inductive Rating — 2 Amps
Lamp Rating — 1 Amps

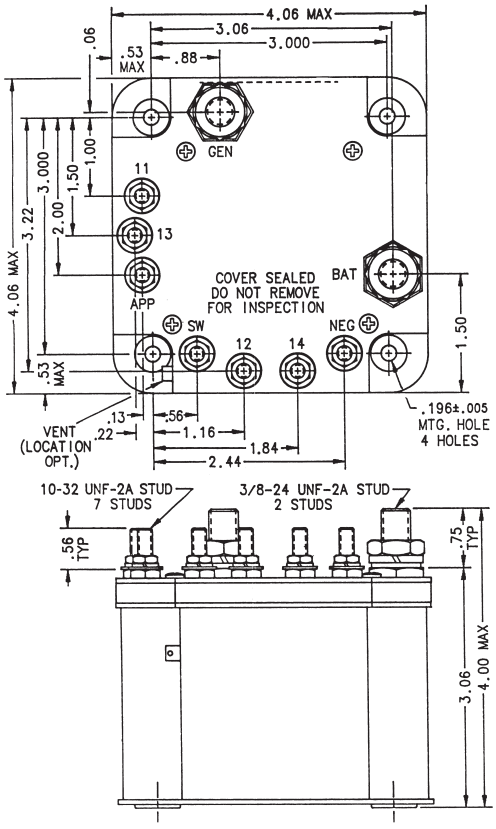
General Characteristics

Weight, Max. — 3 lbs 1 oz

Coil Characteristics

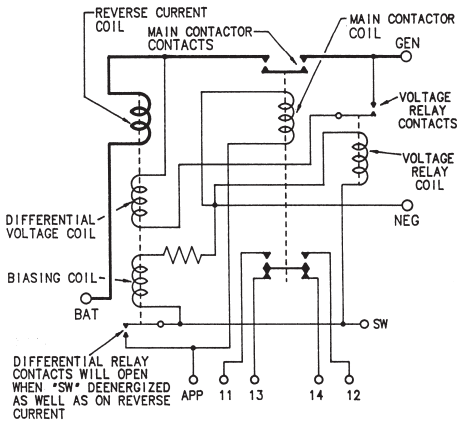
Duty Cycle — Continuous

*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

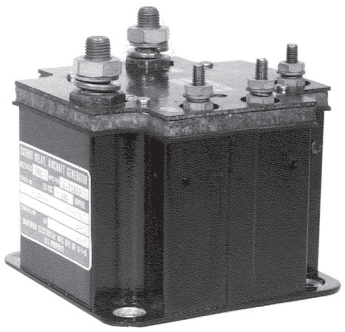
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

Downloaded from Arrow.com.

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

Product Facts

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



Performance Data

Electrical Characteristics

Contact Arrangement — SPST NO

Rated Operating Voltage — 28 Vdc

Current Rating, Continuous — 200 Amps

Current Rating at 15 sec. — 1,000 Amps

Current Rating at 1 min. — 500 Amps

Current Rating at 5 min. — 300 Amps

Interrupting Capacity — 4,500 Amps

Reverse Current Setting* — 6 to 17 Amps

Differential Voltage for Pickup — .85 ± .15 V

General Characteristics

Temperature Range — -55°C to +71°C

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

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

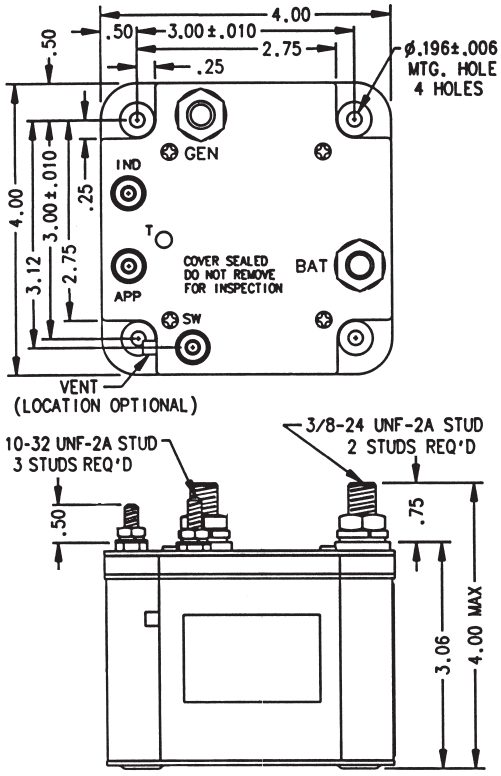
Electrical— 50,000 min.

Weight, Max. — 2 lbs 15 oz

Coil Characteristics

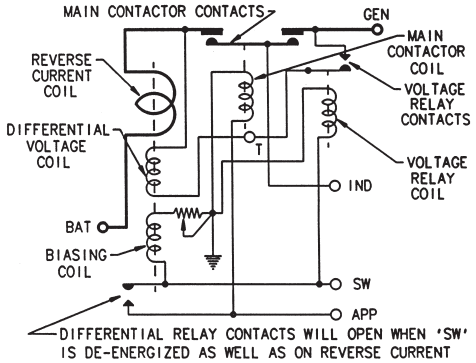
Duty Cycle — Continuous

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



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

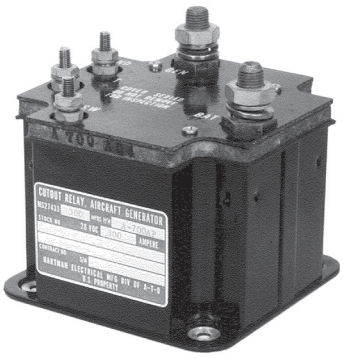
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

Downloaded from Arrow.com.

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 ± .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

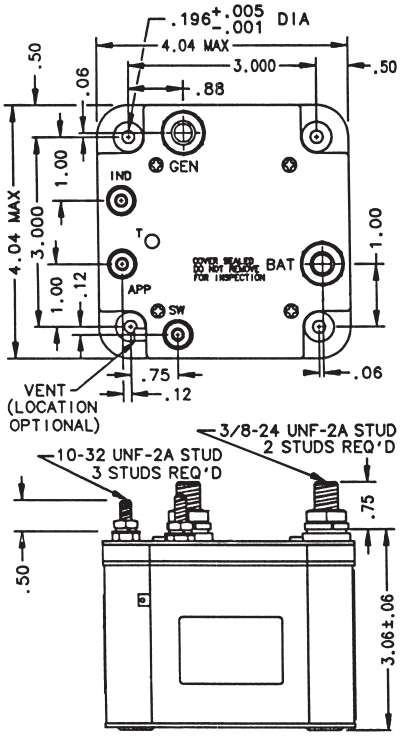
Duty Cycle — Continuous

Duty Cycle when using "APP" — Intermittent

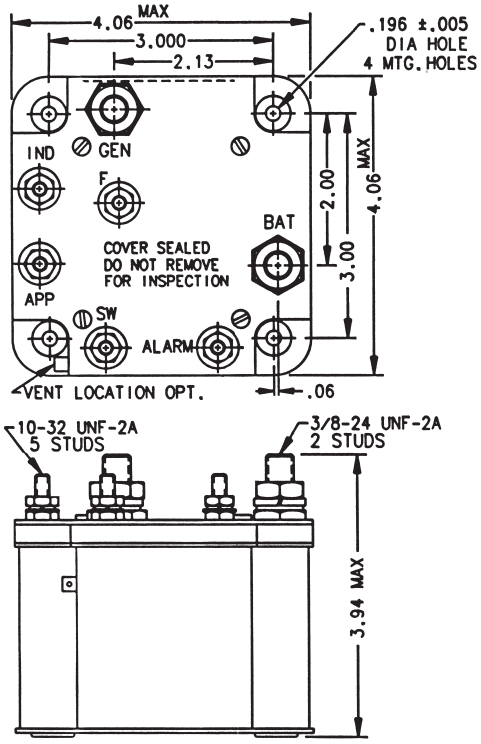
Nom. Coil Voltage — 24 to 30 Vdc

Pickup Voltage, Max. — 18 Vdc

Dropout Voltage — 0.5 to 7.0 Vdc



Mounting Style A



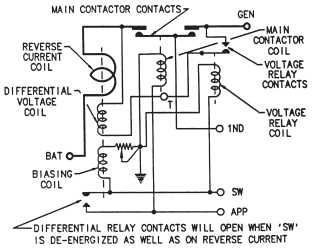
Mounting Style B

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

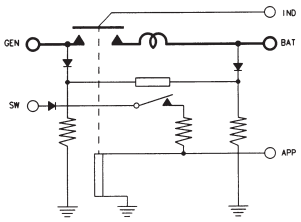
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A-700 Series Cutout — Reverse Current, Rated up to 300 Amps, 28 Vdc (Continued)

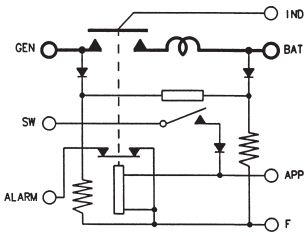
Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 2



Circuit Configuration 3

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

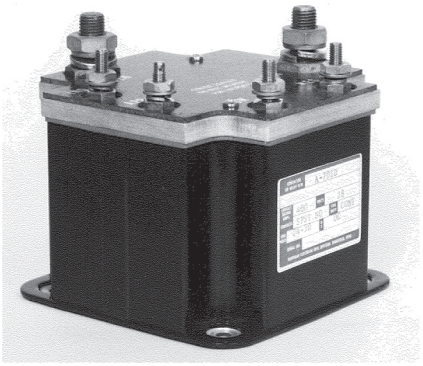
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

Product Facts

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



Performance Data

Electrical Characteristics

Contact Arrangement — SPST NO, Double Break

Rated Operating Voltage — 28 Vdc

Resistive Rating — 400 Amps

Resistive for 30 sec. — 1,000 Amps

Inrush Rating — 1,500 Amps

Reverse Current Dropout —
A-701D — 25 to 50 Amps
A-701C — 18 to 35 Amps

General Characteristics

Temperature Range —
-55°C to +71°C

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

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

Electrical — 50,000 min.

Dielectric Strength —
All Circuits to Ground — 1,250 Vrms
Circuit to Circuit — 1,250 Vrms
Coil to Ground and Aux. Contacts — 500 Vrms

Differential Pickup — 0.5 ± .15 Vdc

Weight, Max. —
A-701D — 3 lbs 10 oz
A-701C — 4 lbs

Coil Characteristics

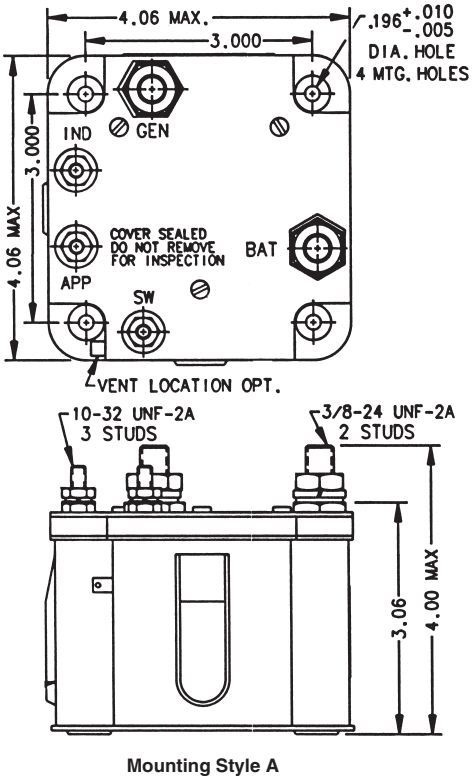
Duty Cycle — Continuous, economizing

Duty Cycle when using "APP"on A-701D or "GMG" on A-701C — Intermittent

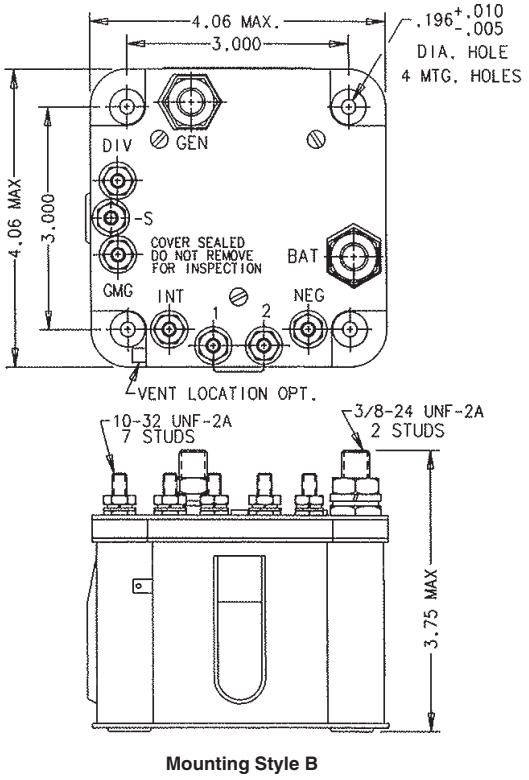
Nom. Coil Voltage — 24 to 30 Vdc

Pickup Voltage, Max. —
A-701D — 15 Vdc
A-701C — 12 Vdc

Dropout Voltage — 0.5 to 7.0 Vdc



Mounting Style A



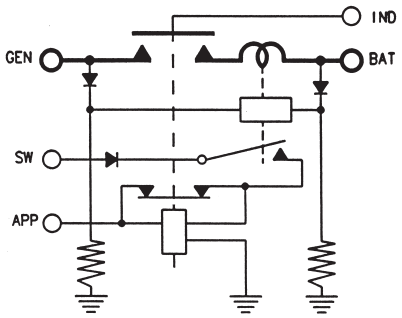
Mounting Style B

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

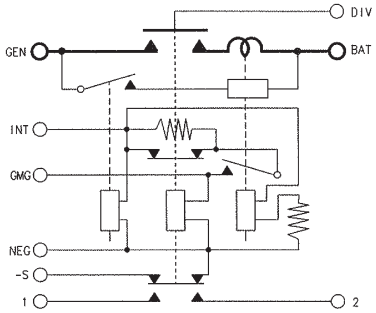
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A-701 Series Cutout — Reverse Current, Rated up to 400 Amps, 28 Vdc (Continued)

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 2

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

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

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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 ± .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

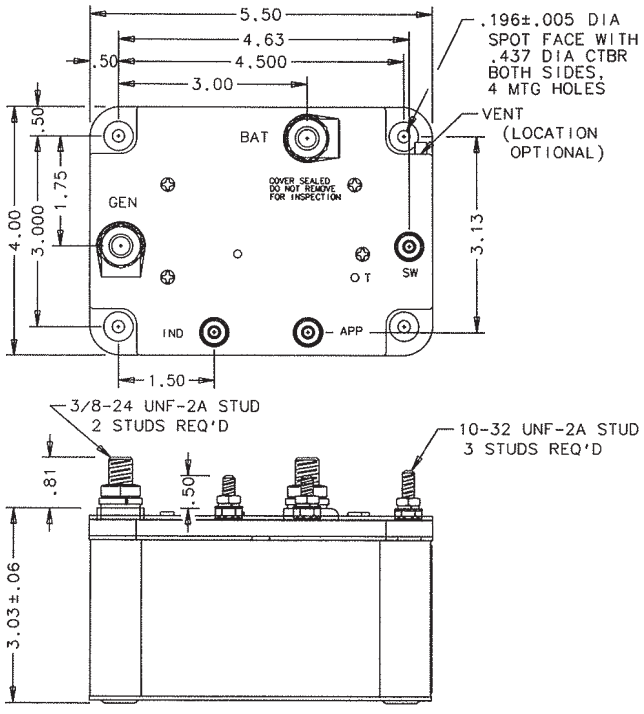
Duty Cycle — Continuous

Duty Cycle when using "APP" — Continuous

Nom. Coil Voltage — 24 to 30 Vdc

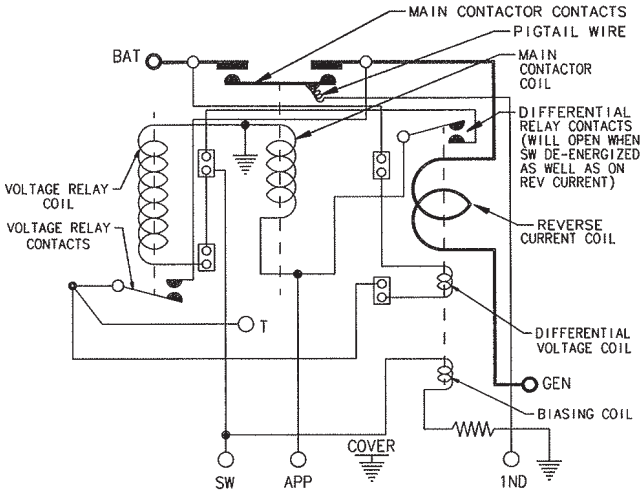
Pickup Voltage, Max. — 18 Vdc

Dropout Voltage — 0.5 to 7.0 Vdc



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

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

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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 Ø (highest of 3Ø)

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

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

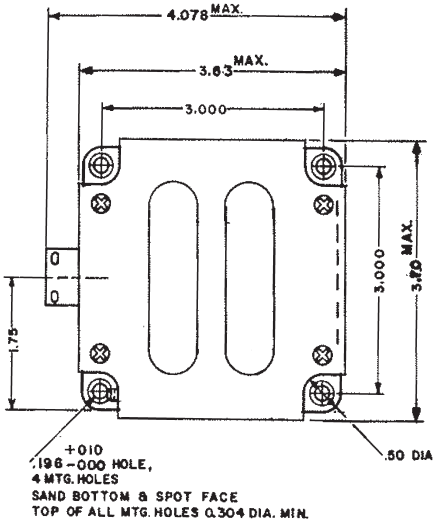
Voltage Transient Limits —

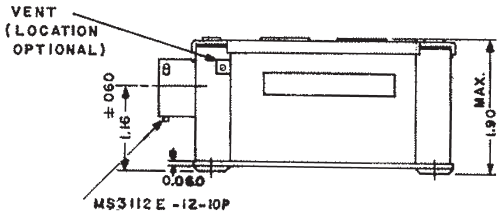
High Side — above limit 2 but below limit 1 of Fig. 2 MIL-STD-704, 3Ø (highest of 3Ø)

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

Over and Under frequency time delay 3 ± 1 sec.

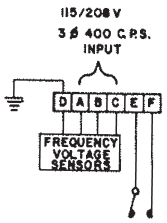
Output rating SPST 3 AMP Ind. 28 V DC/115 V 400 CPS





Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

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

Downloaded from Arrow.com.

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

Product Facts

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



Performance Data

Electrical Characteristics

Contact Arrangement — SPST NO, Double Break

Operating Voltage, Max. — 29 Vdc

Resistive Rating — 600 Amps

Pickup Voltage, Max. — 17 Vdc

Dropout Voltage, Max. — 14 Vdc, except for A-711 which is 1 to 5 Vdc

Pickup Current, Max. — 490 Amps

Dropout Current at any Contactor Voltage — 150 ± 15 Amps, except for A-711R which is S1 — 135 ± 15 Amps and S2 — 235 ± 20 Amps

General Characteristics

Temperature Range — -55°C to +71°C

Operating Cycles (Life) at Rated Resistive Load, Min. — 25,000 cycles

Operating Period, Max. — 3 min.

Weight, Max. — A-711JF, A-711JF — 3 lbs 13 oz
A-711Z — 3 lbs 6 oz
A-711R — 3 lbs 5 oz

Coil Characteristics

Duty Cycle — Intermittent

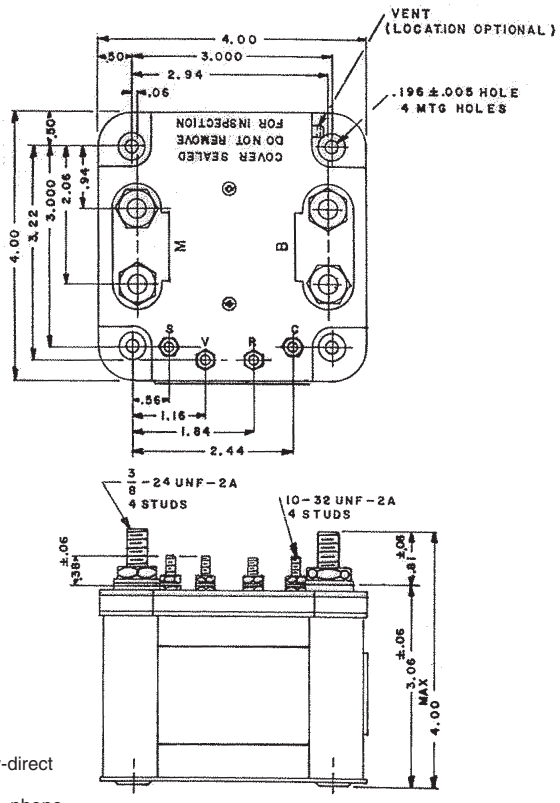
Coil Current, Max. — A-711AJ, A-711JM — 2 Amps
A-711Z — 0.6 Amp
A-711R — 1.0 Amp

Coil Voltage, Nom. — 28 Vdc

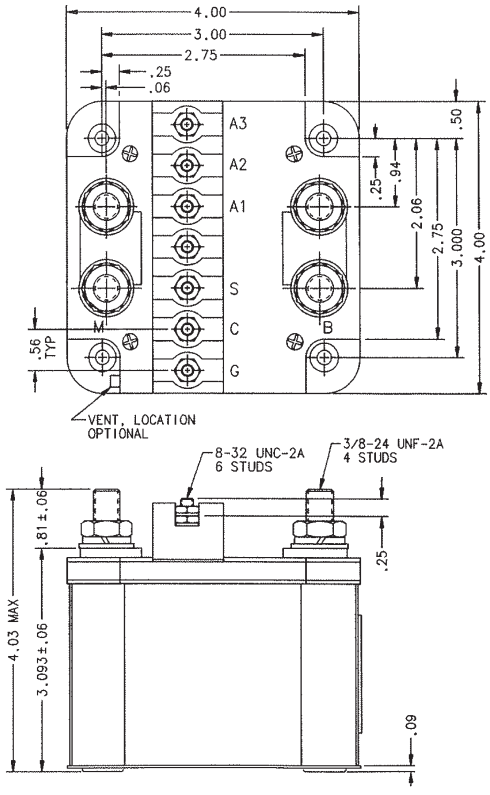
Signal Resistor — 20 Ohm ± 10%, 20 W

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

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



Mounting Style A



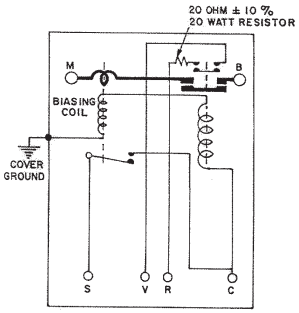
Mounting Style B

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

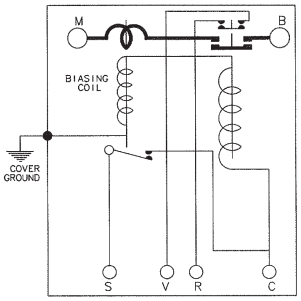
Downloaded from Arrow.com.

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

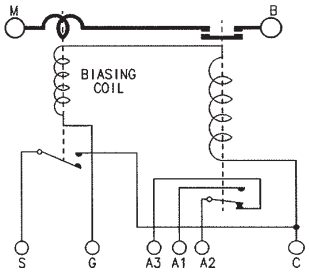
Circuit Configurations (Consult factory for other available circuit configurations)



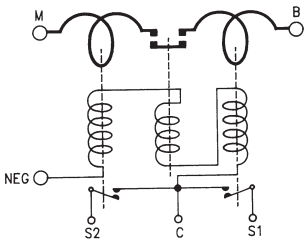
Circuit Configuration 1



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.

Downloaded from Arrow.com.

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

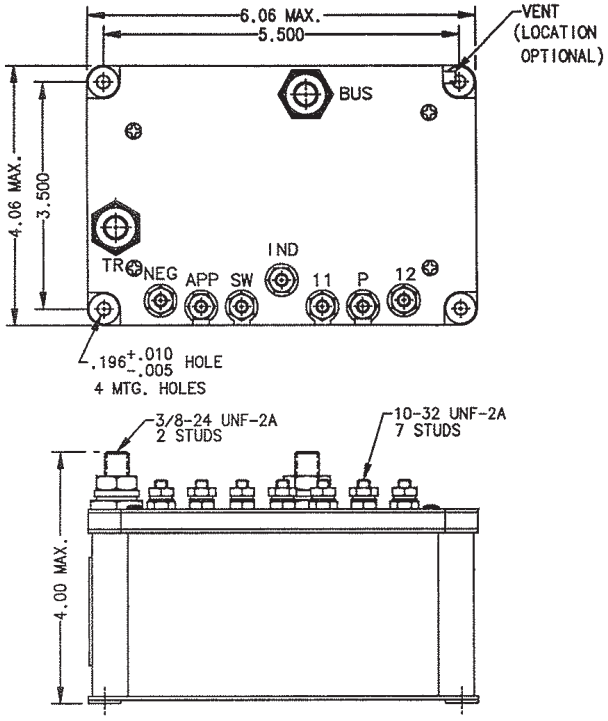
Altitude, Max. — 50,000 ft

Weight, Max. — 4 lbs 8 oz

Coil Characteristics

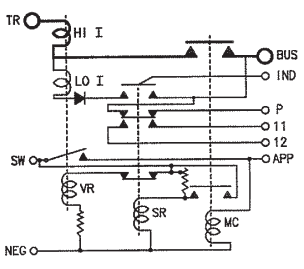
Duty Cycle — Continuous

Coil Voltage, Nom. — 24 to 30 Vdc

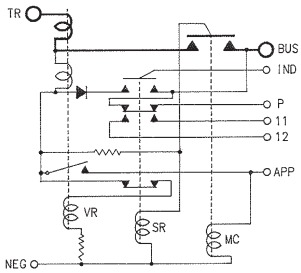


Mounting Style A

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

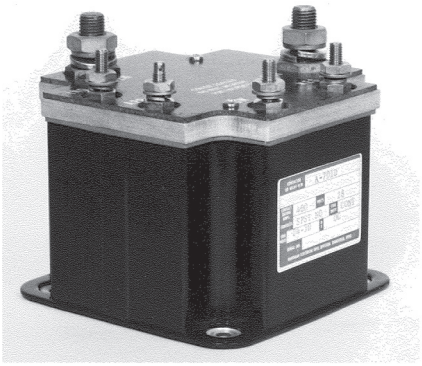
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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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

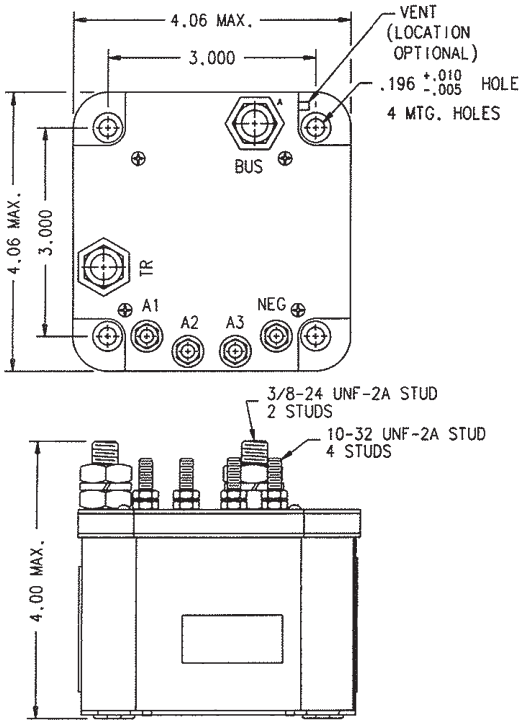
Operating Cycles (Life) Mechanical — 100,000 cycles

Weight, Max. — 3.5 lbs

Coil Characteristics

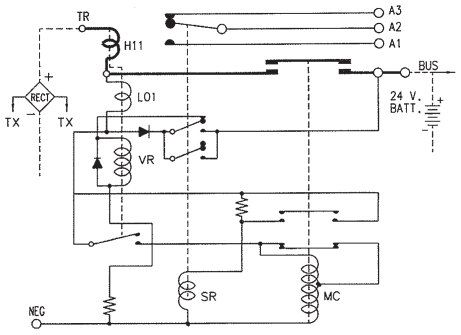
Duty Cycle — Continuous

Coil Voltage, Nom. — 24 to 30 Vdc



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

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

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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

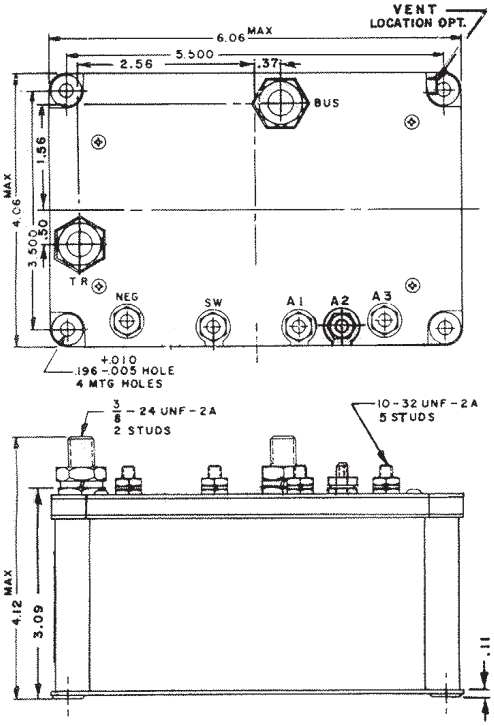
Altitude, Max. — 50,000 ft

Weight, Max. — 4 lbs 8 oz

Coil Characteristics

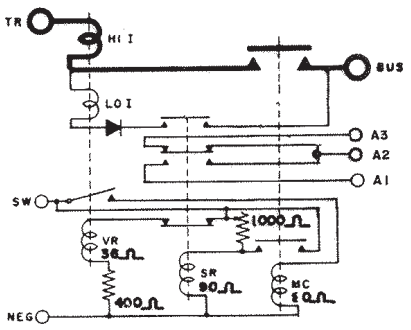
Duty Cycle — Continuous

Coil Voltage, Nom. — 24 to 30 Vdc



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

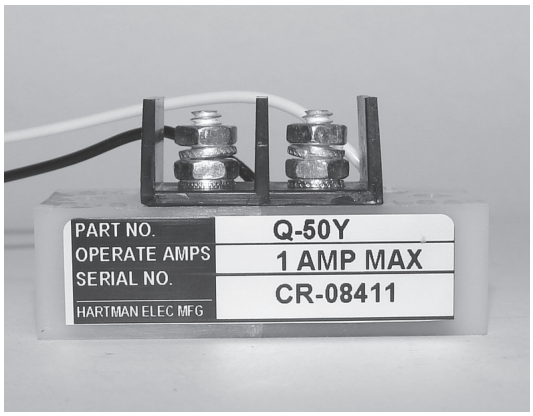
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

Downloaded from Arrow.com.

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

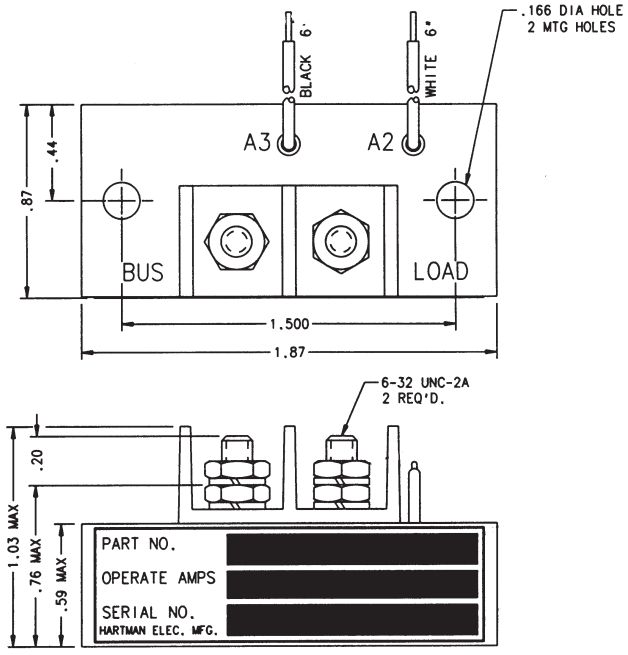
Operating Voltage, Nom. — 28 Vdc

General Characteristics

Temperature Range — -55°C to +71°C

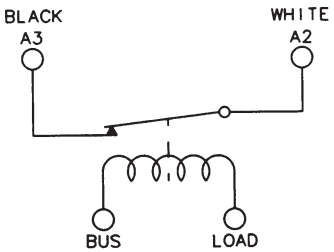
Altitude, Max. — 50,000 ft

Weight, Max. — 1.25 oz



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

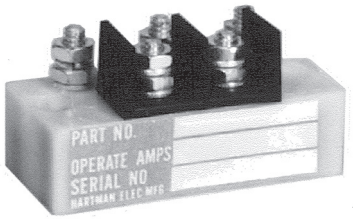
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

Downloaded from Arrow.com.

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

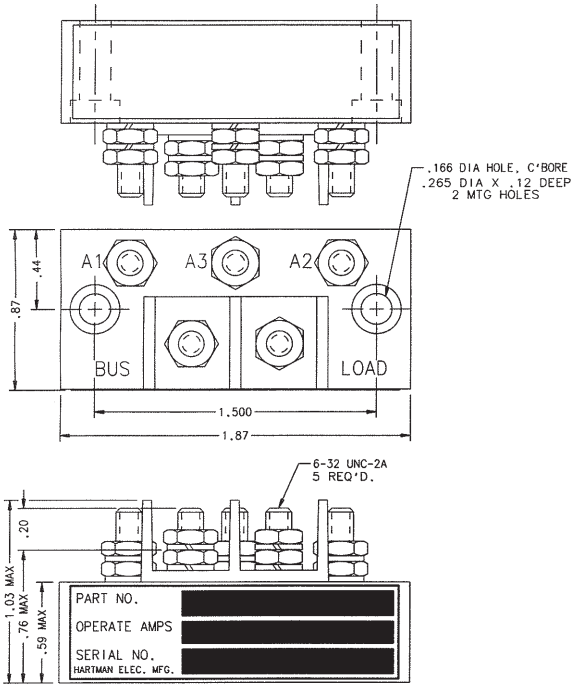
Dropout Min. — 0.8 Amp

General Characteristics

Temperature Range — -55°C to +71°C

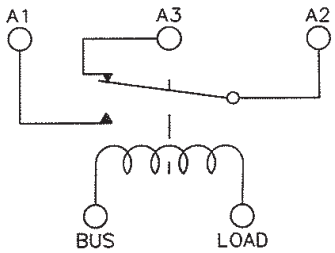
Altitude, Max. — 50,000 ft

Weight, Max. — 1.25 oz



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

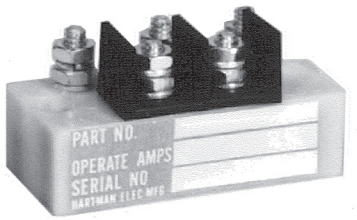
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

Downloaded from Arrow.com.

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

Product Facts

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



Performance Data

Electrical Characteristics

Contact Arrangement — SPST NC

Contact Rating @ 28 Vdc — 0.25 Amp

Rated Operating Voltage — 28 Vdc

Sensing Current Rating — 6.25 Amps, continuous

Lamp Load — 0.080 Amp

Pickup Max. —
Q50BB – 2.5 Amps DC
Q50BD - 2.0 Amps DC
Q50E - 3.5 Amps DC

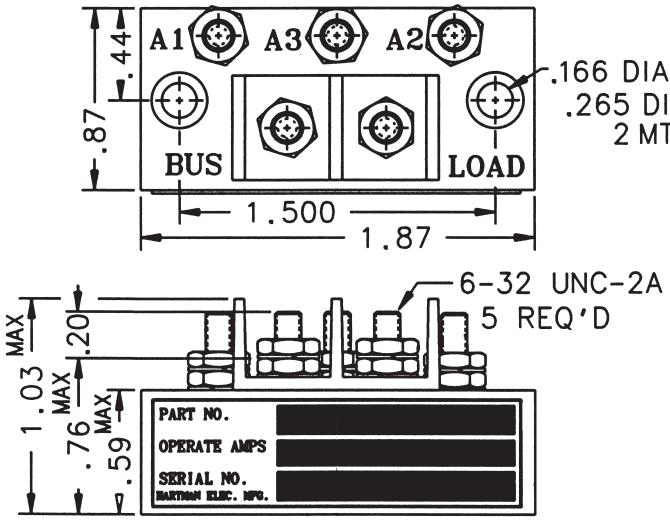
Dropout Min. —
Q50BD - 0.8 Amps DC
Q50BB - 1.0 Amps DC
Q50E - 1.4 Amps DC

General Characteristics

Temperature Range — -55°C to +71°C

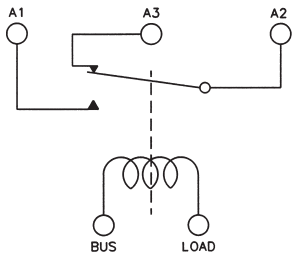
Altitude, Max. — 50,000 ft

Weight, Max. — 1.25 oz



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

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

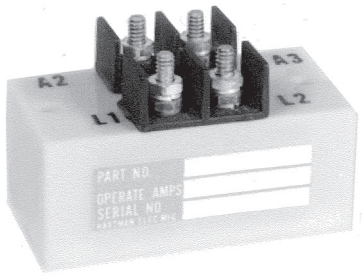
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

Downloaded from Arrow.com.

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

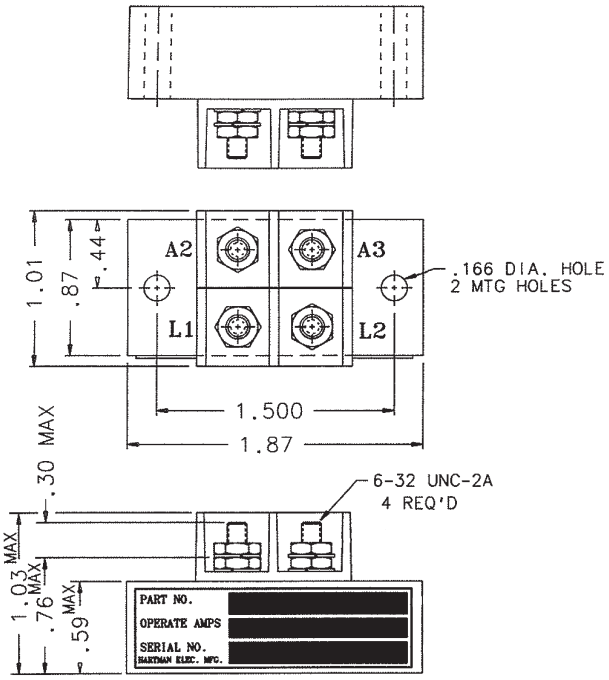
Dropout Min. — 0.5 Amp

General Characteristics

Temperature Range — -55°C to +71°C

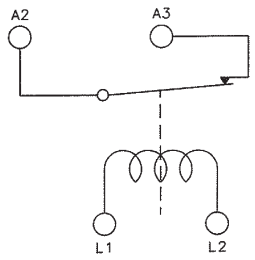
Altitude, Max. — 50,000 ft

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

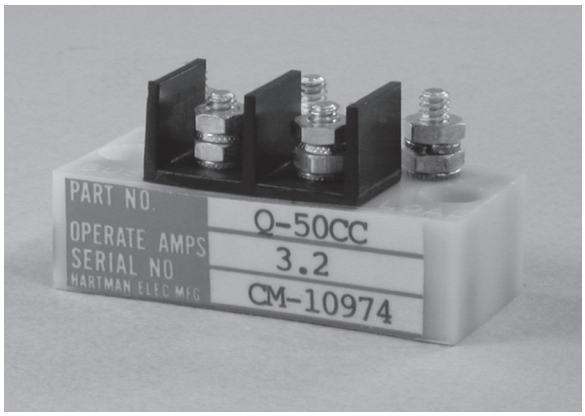
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

Downloaded from Arrow.com.

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

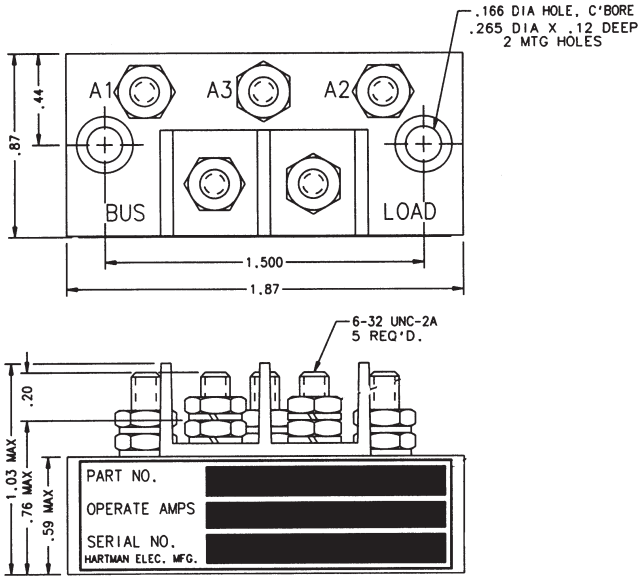
Dropout Min. — 1.2 Amps

General Characteristics

Temperature Range — -55°C to +85°C

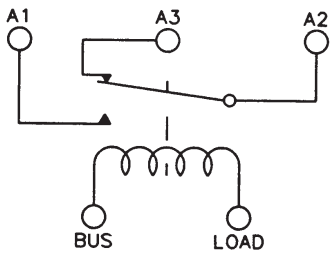
Altitude, Max. — 50,000 ft

Weight, Max. — 1.25 oz



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

HARTMAN Part Number	Construction Type	Mounting Style	Duty Cycle	Circuit Config.	TE Part Number
Q-50CC	Environmentally Sealed	A	Continuous	1	1616131-7

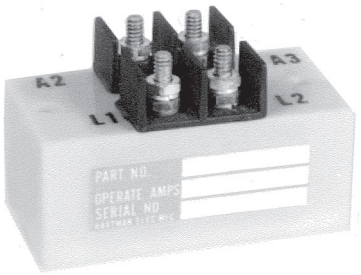
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

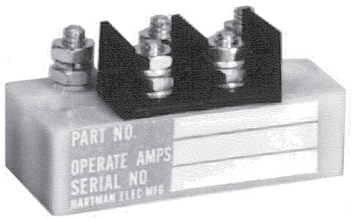
Downloaded from Arrow.com.

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

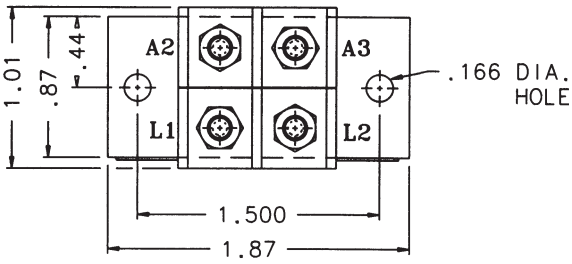
Dropout Min. — 1.2 Amps

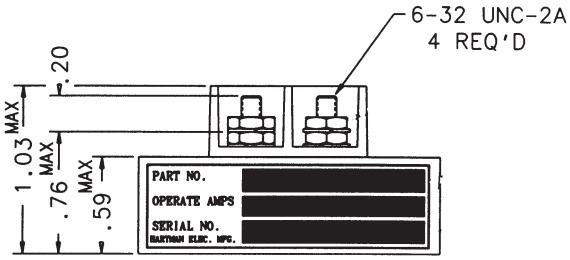
General Characteristics

Temperature Range —
-55°C to +71°C

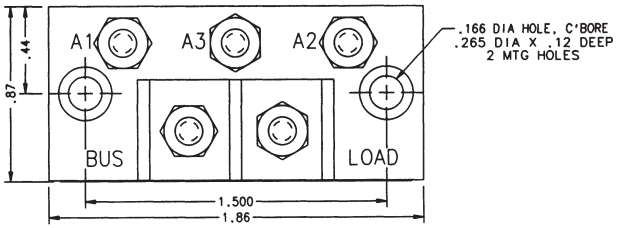
Altitude, Max. — 50,000 ft

Weight, Max. — 1.25 oz

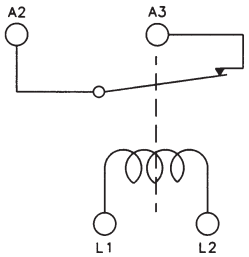




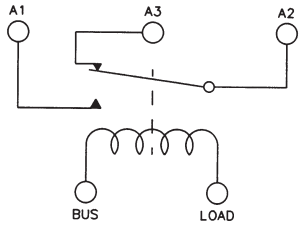
Mounting Style A



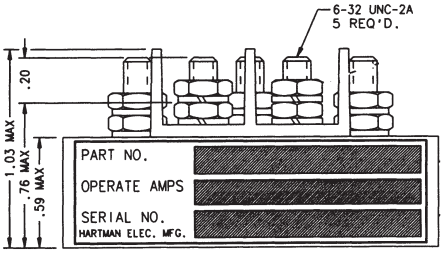
Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1



Circuit Configuration 1



Mounting Style B

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

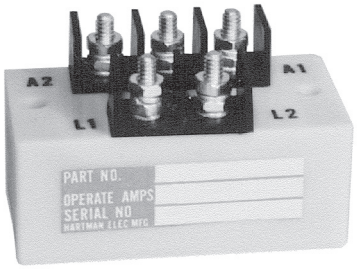
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

Downloaded from Arrow.com.

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

Product Facts

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



Performance Data

Electrical Characteristics

Contact Arrangement — SPST NC, SPST NO or SPDT

Contact Rating @ 28 Vdc —
Q-50AB-2 — 0.2 Amp
Q-50J, — 0.25 Amp
Q-50AG — 1.0 Amp
Q-50AB-1 — 1 Amp switching, and 2 Amps carry
Q50AC — 2 Amp

Lamp Load @ 28 Vdc —
Q-50AC, Q-50AB-2 — 0.08 Amp
Q-50J, Q-50AG — 0.20 Amp

Operating Voltage, Nom. — 28 Vdc

Sensing Current Rating —
20 Amps continuous, max. except for Q-50AB-1 and Q-50AB-2 which are 10 Amps max. and 15 Amps max. for 3 sec.
Q50AC 2 Amps continuous 10 Amps max. for 5 seconds

Pickup Max. —
Q-50AC — 0.3 Amp
Q-50AB-1, Q-50AB-2 — 1.5 Amp
Q-50J — 3.5 Amps DC
Q-50AG — 6 Amps DC ± 20%

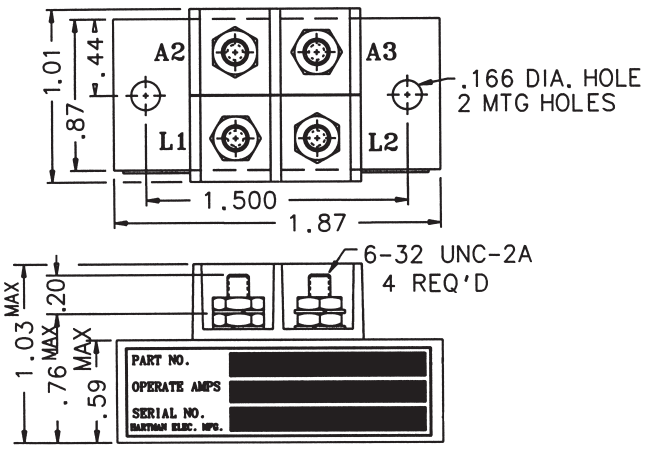
Dropout Min. —
Q-50AC — 0.1 Amp
Q-50J — 0.5 Amp
Q-50AB-1, Q-50AB-2 — less than 1 Amp
Q-50AG — 2.4 Amp

General Characteristics

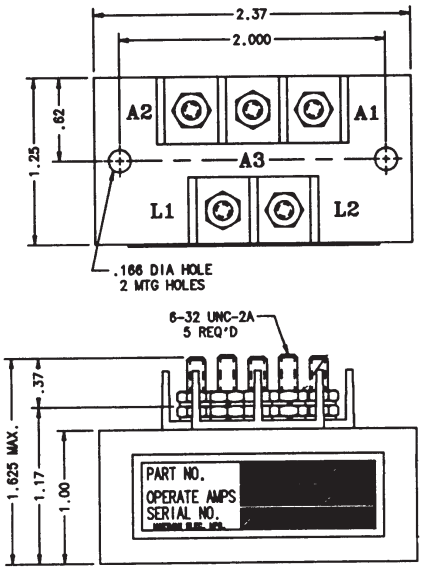
Temperature Range — -55°C to +71°C

Altitude, Max. —
Q-50J, Q-50AB-1 — 50,000 ft
Q-50AC, Q-50AG, Q-50AB-2 — 60,000 ft

Weight, Max. — 1.25 oz



Mounting Style A



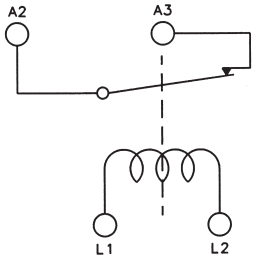
Mounting Style B

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

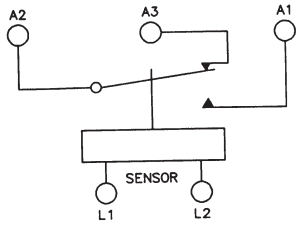
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Q-50 Series Relay, Current Indicator, Rated up to 20 Amps, 28 Vdc (Continued)

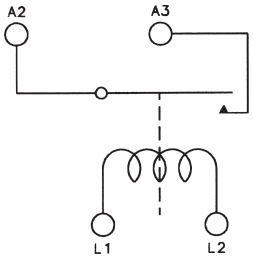
Circuit Configurations (Consult factory for other available circuit configurations)



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

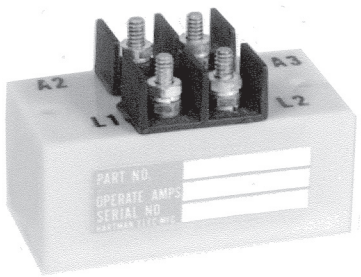
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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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

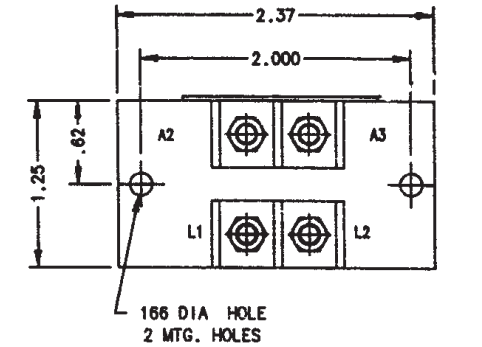
Altitude — 50,000 ft

Weight, Max. — .25 lbs

Operating Voltage, Nom. — 115 Vrms, 325-600 Hz

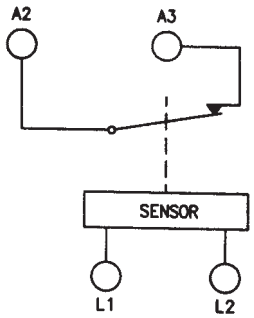
Pickup Max. — 95 MA, AC

Dropout Min. — 47 MA AC



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

HARTMAN Part Number	Construction Type	Mounting Style	Duty Cycle	Circuit Config.	TE Part Number
QR-50V	Environmentally Sealed	A	Continuous	1	1616132-3

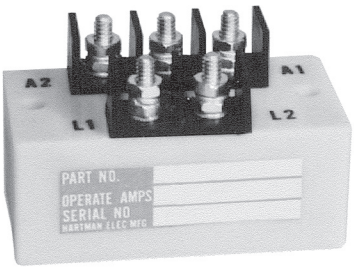
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

Downloaded from Arrow.com.

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

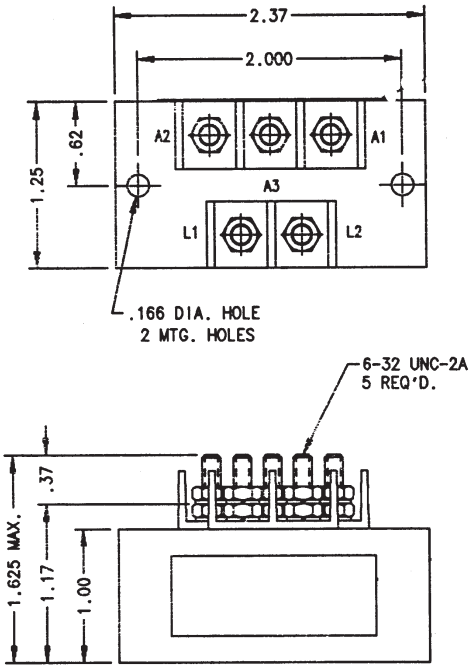
General Characteristics

Temperature Range — -55°C to +71°C

Altitude — 50,000 ft

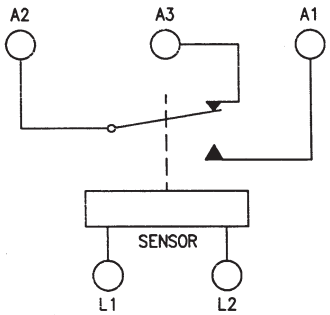
Weight, Max. — .19 lbs

Sinusoidal Vibration — 10 G to 500 Hz



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

HARTMAN Part Number	Construction Type	Mounting Style	Duty Cycle	Circuit Config.	TE Part Number
QR-50H	Environmentally Sealed	A	Continuous	1	1616132-1

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

Downloaded from Arrow.com.

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

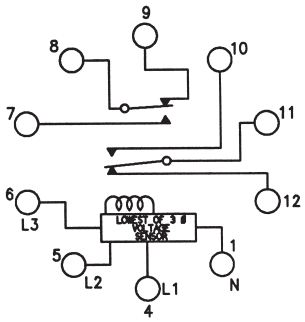
Temperature Range — -55°C to +71°C

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

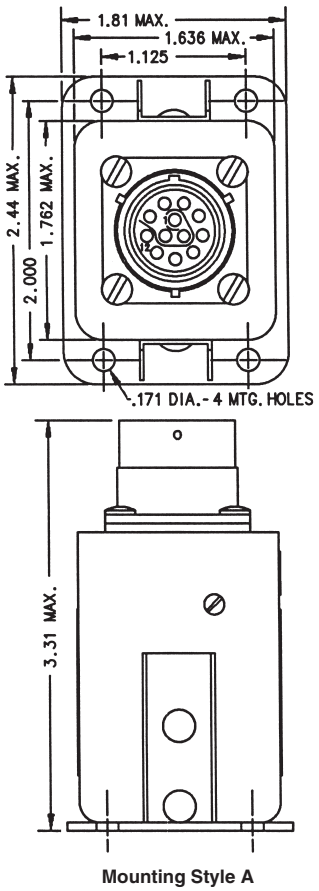
Weight, Max. — 10 oz.

Operating Voltage, Max. — 124 VAC

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1



Mounting Style A

HARTMAN Part Number	Construction Type	Mounting Style	Duty Cycle	Circuit Config.	TE Part Number
E-316C	Gasket/Vented	A	Continuous	1	1-1616126-4

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

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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

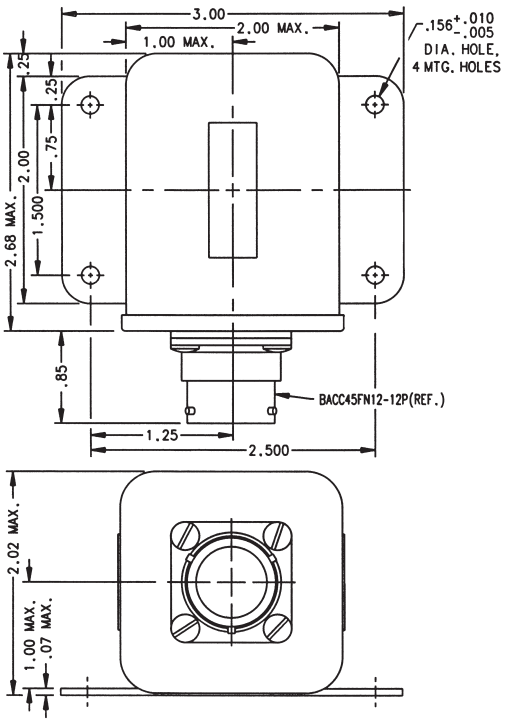
Insulation Resistance @ 500 Vdc — 100 megohm min.

Altitude — 80,000 ft

Weight, Max. — .25 lbs

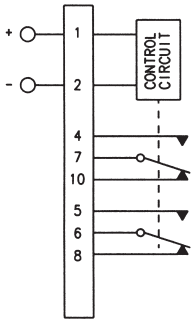
Sinusoidal Vibration — .060 DA @ 5 to 80 Hz
20 G ™ 80 to 2000 Hz

Shock for 11 msec, 1/2 Sine, 3 Axes — 30 G



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



HARTMAN Part Number	Construction Type	Mounting Style	Duty Cycle	Circuit Config.	TE Part Number
E-311PB	Hermetically Sealed	A	Continuous	1	1-1616126-1

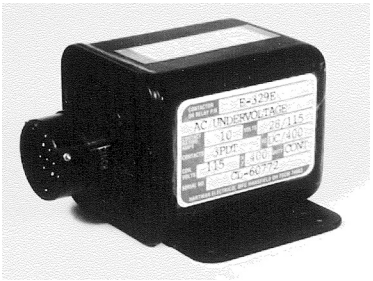
For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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E-329 Series Relay, Voltage Sensing

Product Facts

- 3PDT
- Solder sealed cover, hermetically sealed contacts
- Meets many requirements of MIL-PRF-6106



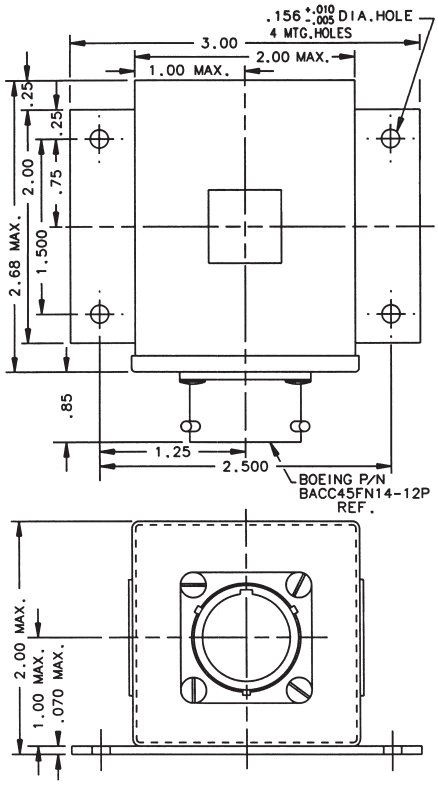
Performance Data

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

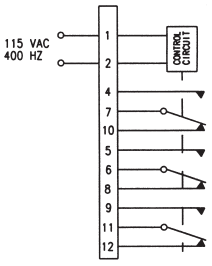
General Characteristics

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

HARTMAN Part Number	Construction Type	Mounting Style	Duty Cycle	Circuit Config.	TE Part Number
E-329E	Hermetically Sealed	A	Continuous	1	1-1616126-9

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

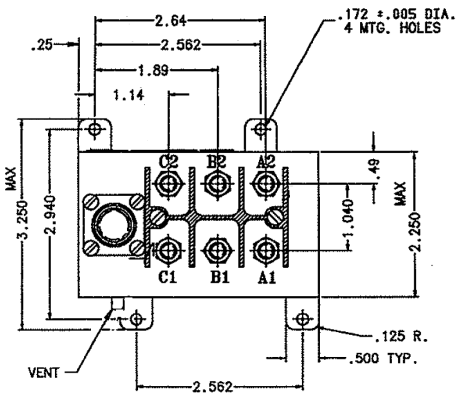
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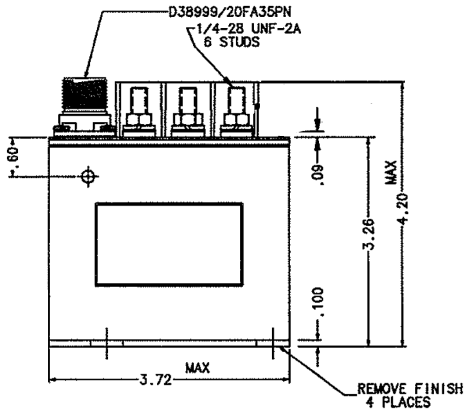
RA-3100 Series Remote Power Controller, Rated up to 60 Amps, 115/208 VAC

Product Facts

- 3PST NO
- Gasket sealed







Mounting Style A

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

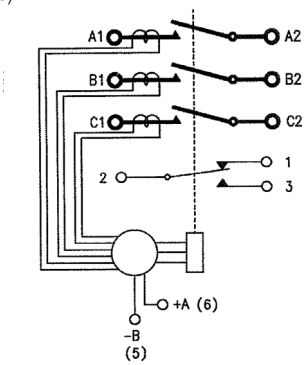
Temperature Range — -55°C to +85°C

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

Altitude — 50,000 ft

Weight, Max. — 1.55 lbs

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-3100H	Gasket/Vented	A	Continuous, Economizing	1	1616539-3

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

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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

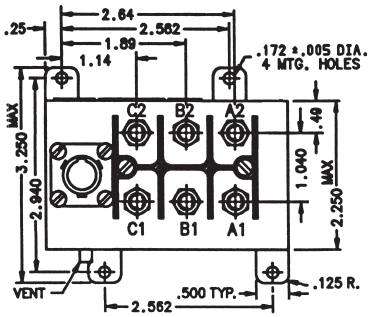
Sinusoidal Vibration — .038 DA from 10 to 50 Hz
10g from 55 to 2000 Hz

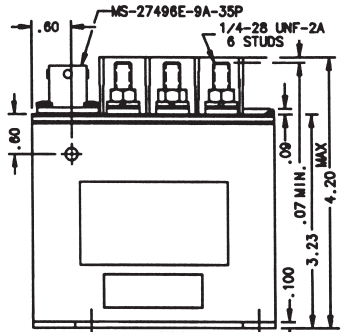
Shock, Max. — 9 G max for 10-12 ms

Load, Min. — 50,000 cycles

Operating Cycles (Life)

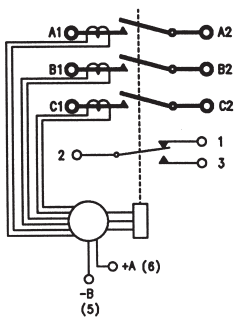
Mechanical, Min. — 100,000 cycles





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-3100F	Gasket/Vented	A	Continuous, Economizing	1	1616133-2

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

Downloaded from Arrow.com.

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

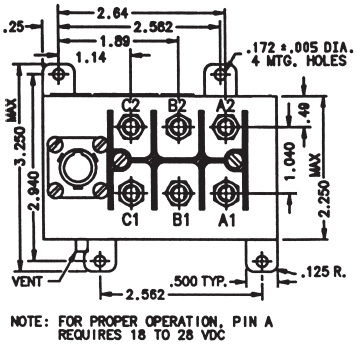
Temperature Range — -55°C to +85°C

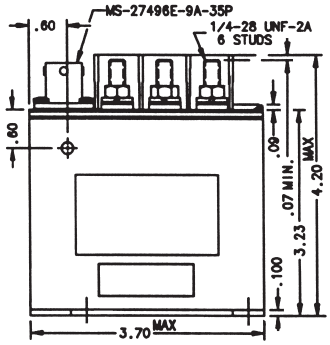
Operating Cycles (Life) at Rated Load, Min. — 50,000 cycles

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

Altitude — 50,000 ft

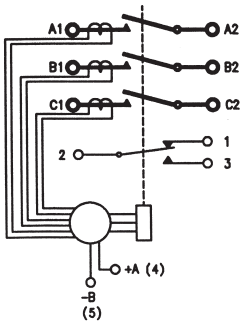
Weight, Max. — 1.55 lbs





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.

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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

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

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

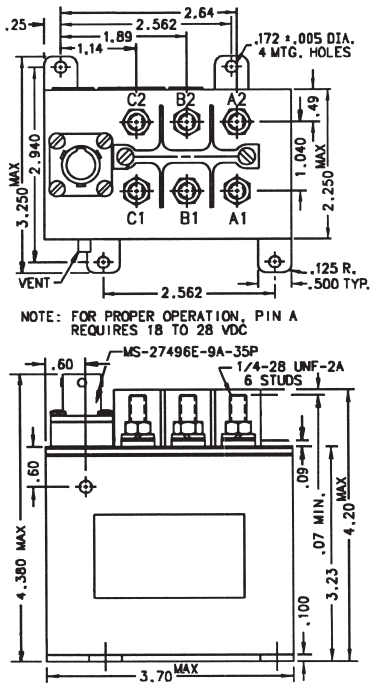
Temperature Range —
-55°C to +85°C

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

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

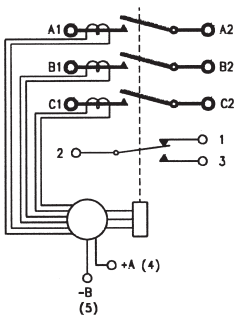
Altitude — 60,000 ft

Weight, Max. — 1.55 lbs



Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)



Circuit Configuration 1

HARTMAN Part Number	Construction Type	Mounting Style	Coil Type	Circuit Config.	TE Part Number
RA-3100J-1	Gasket/Vented	A	Continuous, Economizing	1	1616133-3
RA-3100L	Gasket/Vented	A	Continuous, Economizing	1	1616133-4

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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

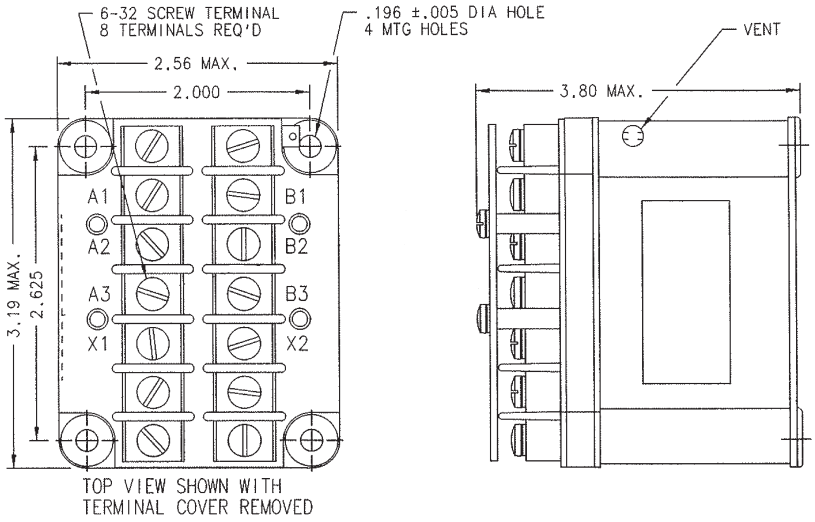
Contact Arrangement — DPDT
Operating Voltage, Nom. — 28 Vdc
Resistive Rating — 10 Amps
Inductive Rating — 2 Amps

General Characteristics

Operating Ambient Temperature Range — -55°F to +165°F
Altitude — 50,000 ft
Weight, Max. — 15.5 oz

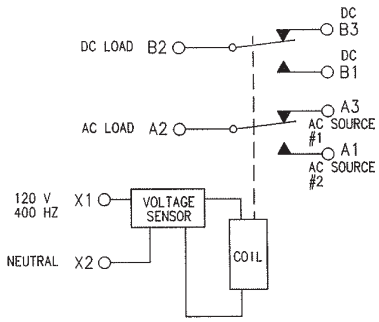
Coil Characteristics

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.

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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
300	DC	28	SPST NO	Side Stable	N/A	28	Gasket/Vented		Cont.	A-700AAP	1616109-1
		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
600	DC	29	SPST NO	Side Stable	SPST NO	28	Gasket/Vented		Int.	A-711JF	1-1616109-6
		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
200	DC	28	SPST NO	Side Stable	SPST NO SPST NC	24-30	Gasket/Vented		Cont.	A-957CSD	1616110-6
		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
6.25	DC	28	SPDT	Side Stable	–	28	Environ		Cont.	Q-50BB	1616131-5
		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
20	DC	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
		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
10	DC	28	DPDT	Side Stable	–	–	Gasket/Vented		Cont.	E-316C	1-1616126-4
		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.

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Cross Reference (Continued)

Main Current Rating	AC/DC	Rating	Main Contact Config.	Operating Mode	Aux. Contact Config.	Coil Voltage (VDC)	Seal Type	Duty Cycle	Coil Trans. Voltage	HARTMAN Part No.	TE Part No.
100	AC	115/208	3PST NO	Side Stable	SPDT	18-32	Gasket/Vented	Cont.	Econ.	RA-3100M	1616133-5
		115/208	3PST NO	Side Stable	SPDT	18-32	Gasket/Vented	Cont.	Econ.	RA-3100D	1616133-1
110	AC	115/208	3PST NO	Side Stable	SPDT	18-32	Gasket/Vented	Cont.	Econ.	RA-3100J-1	1616133-3
50	AC	115/208	3PST NO	Side Stable	SPDT	18-32	Gasket/Vented	Cont.	Econ.	RA-3100L	1616133-4
60	AC	115/208	3PST NO	Side Stable	SPDT	18-32	Gasket/Vented	Cont.	Econ.	RA-3100H	1616539-3
70	AC	115/208	3PST NO	Side Stable	SPDT	18-32	Gasket/Vented	Cont.	Econ.	RA-3100F	1616133-2
10	DC	28	DPDT	Side Stable	–	120V	Gasket/Vented	Cont.		E-308TA	1616126-6

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