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

### Product Facts
- 3PDT, Electrically latched
- Hermetically sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106

### Performance Data

#### Electrical Characteristics
- **Contact Arrangement** — 3PDT, Electrically Latched
- **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

#### Coil Characteristics
- **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 Type

- **A** — AC Continuous
- **B** — Continuous
- **C** — Continuous with Suppression

---

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

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Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.
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
Circuit Configurations (Consult factory for other available circuit configurations)

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

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</table>
**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.

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

---

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<thead>
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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, Electrically latched
- 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, Electrically Latched
- 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 & C, See diagram below)
  - Vdc — Continuous with suppression (Type B, See diagram below)
  - Vdc — Continuous with suppression (Type C & D, See diagram below)
- Operating Voltage, Nom.: VAC 400 Hz — 115 VAC
  Vdc — 28 Vdc
- Pickup Voltage @ 25°C, Max.: VAC 400 Hz — 75 VAC
  Vdc — 18 Vdc
- Dropout Voltage @ 25°C, Max.: VAC 400 Hz — 12 to 38 VAC
  Vdc — 1 to 7 Vdc
- Coil Resistance ±20% @ 25°C:
  - VAC 400 Hz — 505 Ohms
  - Vdc — 126 Ohms
- Coil Current @ 25°C, Max.: VAC 400 Hz — .065 Amp
  Vdc — .28 Amp

Coil Type

A — AC Continuous
B — Continuous
C — Continuous with Suppression
D — Continuous with Suppression
E — AC Continuous

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
D7, DH7, DHR7, DR7 Series, Rated up to 50 Amps, 115/200 VAC, 400 Hz (Continued)

Mounting Style A

Mounting Style B

Mounting Style C

Mounting Style D
HARTMAN Power Switching AC Contactors

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
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
Circuit Configurations (Consult factory for other available circuit configurations)

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

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

Performance Data

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<td>Motor Rating</td>
<td>30 Amps</td>
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<tr>
<td>Lamp Rating</td>
<td>15 Amps</td>
</tr>
<tr>
<td>Rupture Rating</td>
<td>400 Amps</td>
</tr>
</tbody>
</table>

General Characteristics
- Temperature Range: -55°C to +71°C
- Operating Cycles (Life) at Rated Resistive Load, Min.: 50,000 cycles
- Operating Cycles (Life) Mechanical, Min.: 100,000 cycles
- Dielectric Strength:
  - All Circuits to Ground: 1,500 Vrms
  - Circuit to Circuit: 1,500 Vrms
  - Coil to Ground and Aux. Contacts: 1,000 Vrms
- Insulation Resistance, Initial: 100 megohm min.
- Altitude: D-18 — 50,000 ft.
  - DH-18, DHR-18 — 80,000 ft.
- Weight, Max.: .94 to 1.50 lbs

Sinusoidal Vibration
- 10 G @ 70 to 2,000 Hz

Shock, Max.: 25 G

Operate Time @ Nom. Voltage, Max.: 35 msec

Release Time @ Nom. Voltage, Max.: 15 msec

Bounce Time @ Nom. Voltage, Max.: 5 msec

Coil Characteristics
- Duty Cycle:
  - AC Continuous (Type E, See diagram below)
  - DC Continuous (Type A-D, See diagram below)

Operating Voltage, Nom.: 28 Vdc

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

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

Coil Resistance ±20% @ 25°C:
- 175 Ohms

Coil Current @ 25°C, Max.:
- .175 Amp

Coil Type

A — DC Continuous

B — DC Continuous

C – DC Continuous with Suppression

D — DC Continuous - Economical w/Suppression

E – AC Continuous

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
D18, DH18 and DHR18 Series Contactors, Rated up to 50 Amps, 115/200 VAC, 400 Hz (Continued)

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

Mounting Style A

Mounting Style B

Mounting Style C

Mounting Style D
HARTMAN Power Switching AC Contactors

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)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<tbody>
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<td>D-18</td>
<td>Gasket/Vented</td>
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<td>A</td>
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<td>C</td>
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<td>D</td>
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<td>C</td>
<td>E</td>
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<td>1616099-1</td>
</tr>
</tbody>
</table>

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
**Product Facts**
- 3PST NO, Double break
- Hermetically sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106

---

**Performance Data**

**Electrical Characteristics**

<table>
<thead>
<tr>
<th>Contact Arrangement</th>
<th>3PST NO, Double Break</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Operating Voltage</td>
<td>28 Vdc or 115/200 VAC, 400 Hz, 3 phase</td>
</tr>
<tr>
<td>Resitive Rating</td>
<td>50 Amps</td>
</tr>
<tr>
<td>Inductive Rating</td>
<td>115/200 VAC, 400 Hz, 3 phase — 50 Amps</td>
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<tr>
<td>Motor Rating</td>
<td>50 Amps</td>
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</tbody>
</table>

---

**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
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
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](image1)
![Circuit Configuration 2](image2)
![Circuit Configuration 3](image3)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>BH-316</td>
<td>Hermetically Sealed</td>
<td>A</td>
<td>Continuous</td>
<td>2</td>
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<tr>
<td>BH-316A</td>
<td>Hermetically Sealed</td>
<td>A</td>
<td>Continuous</td>
<td>1</td>
<td>1616008-5</td>
</tr>
<tr>
<td>BH-316D</td>
<td>Hermetically Sealed</td>
<td>A</td>
<td>Continuous</td>
<td>1</td>
<td>1616008-6</td>
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<tr>
<td>BH-316C</td>
<td>Hermetically Sealed</td>
<td>B</td>
<td>Continuous</td>
<td>3</td>
<td>1-1616520-0</td>
</tr>
</tbody>
</table>
# B-138 Series, Rated up to 60 Amps, 115/200 VAC, 400 Hz

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

![Circuit Configuration 1](image1)

![Circuit Configuration 2](image2)

![Circuit Configuration 3](image3)

![Circuit Configuration 4](image4)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-138S</td>
<td>Gasket/Vented</td>
<td>B</td>
<td>B</td>
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<td>1616002-5</td>
</tr>
<tr>
<td>B-138XEH</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>C</td>
<td>4</td>
<td>1616028-3</td>
</tr>
<tr>
<td>B-138BH</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>A</td>
<td>1</td>
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<tr>
<td>B-138XAH</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>A</td>
<td>3</td>
<td>1616028-2</td>
</tr>
</tbody>
</table>

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
HARTMAN Power Switching AC Contactors

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-610G

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

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.

US: 1-800-522-6752
Canada: 1-905-470-4425
Mexico: 01-800-733-8926
C. America: 52-55-1106-0803
South America: 55-11-2103-6000
Hong Kong: 852-2735-1628
Japan: 81-44-844-8013
UK: 44-8706-080-208
B-140 Series, Rated up to 60 Amps, 115/200 VAC, 400 Hz (Continued)

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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</thead>
<tbody>
<tr>
<td>B-140AP-1</td>
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<td>Gasket/Vented</td>
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<td>Gasket/Vented</td>
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<td>Continuous</td>
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<td>1-1616043-0</td>
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Mounting Style A

Mounting Style B

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
HARTMAN Power Switching AC Contactors

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

Product Facts
- 3PDT, Electrically latched
- 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

Circuit Configurations

(Circuit Configuration 1)

HARTMAN

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<tbody>
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<td>DH-7BC</td>
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<td>Continuous</td>
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</tbody>
</table>

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

Catalog 5-1773450-5
Revised 9-08
www.tycoelectronics.com

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.
Dimensions are shown for reference purposes only. Specifications subject to change.
USA: 1-800-522-6752
Canada: 1-905-470-4425
Mexico: 01-800-733-8926
C. America: 52-55-1106-0803
South America: 55-11-2103-6000
Hong Kong: 852-2733-1628
Japan: 81-44-844-8013
UK: 44-8706-090-208
HARTMAN Power Switching AC Contactors

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

Product Facts
- 3PDT, Electrically latched
- Gasket sealed or Hermetically sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106

Performance Data

Electrical Characteristics
- Contact Arrangement — 3PDT, Electrically Latched
- 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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Hong Kong: 852-2735-1628
Japan: 81-44-844-8013
UK: 44-8706-080-208

Catalog 5-1773450-5
Revised 9-08
www.tycelectronics.com
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.

Dimensions are in inches unless otherwise specified. Values in brackets are metric equivalents.
Circuit Configurations (Consult factory for other available circuit configurations)

<table>
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<tr>
<th>Circuit Configuration 1</th>
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<th>Circuit Configuration 4</th>
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### HARTMAN Construction Mounting Circuit Tyco Electronics

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<th>Part Number</th>
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<th>Style</th>
<th>Type</th>
<th>Type</th>
<th>Config.</th>
<th>Part Number</th>
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<td>D-25BD</td>
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<tr>
<td>DH-25B</td>
<td>Hermetically Sealed</td>
<td>C</td>
<td>B</td>
<td>4</td>
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<td>DH-25BA</td>
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<tr>
<td>DHR-25BG</td>
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<td>A</td>
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<td>1-1616037-5</td>
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</tr>
</tbody>
</table>

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
D25 and DH25 Series, Rated up to 120 Amps, 115/200 VAC, 400 Hz

Product Facts
- 3PST NO, Electrically latched
- Gasket sealed or Hermetically sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106

Performance Data

Electrical Characteristics
- Contact Arrangement: 3PST NO, Electrically Latched
- Rated Operating Voltage: 115/200 VAC, 400 Hz, 3 phase
- Resistive Rating: 120 Amps
- Inductive Rating: 120 Amps
- Motor Rating: 100 Amps
- Rupture Rating: 1,000 Amps

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

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

Coil Type

A — Continuous
B — Continuous with Suppression

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
D25 and DH25 Series, Rated up to 120 Amps, 115/200 VAC, 400 Hz (Continued)

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-25CF</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>A</td>
<td>1</td>
<td>1616015-1</td>
</tr>
<tr>
<td>DH-25CU</td>
<td>Hermetically Sealed</td>
<td>B</td>
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<td>2</td>
<td>1616017-4</td>
</tr>
</tbody>
</table>

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
HARTMAN Power Switching AC Contactors

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

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-31C</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>Continuous</td>
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<td>1616049-1</td>
</tr>
</tbody>
</table>

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
### D-31, DH-31, and DHL-31 Series, Rated up to 120 Amps, 115/200 VAC, 400 Hz

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

**Performance Data**

<table>
<thead>
<tr>
<th>Electrical Characteristics</th>
<th>General Characteristics</th>
<th>Coil Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contact Arrangement</strong> — 3PDT, Center Off</td>
<td><strong>Temperature Range</strong> — -55°C to +71°C</td>
<td><strong>Duty Cycle</strong> — Continuous (Type A, See diagram below)</td>
</tr>
<tr>
<td><strong>Rated Operating Voltage</strong> — 115/200 VAC, 400 Hz, 3 phase</td>
<td><strong>Operating Cycles (Life) at Rated Resistive Load, Min.</strong> — 50,000 cycles</td>
<td>Continuous with suppression (Type B or Type C, See diagram below)</td>
</tr>
<tr>
<td><strong>Resistive Rating</strong> — 120 Amps</td>
<td><strong>Operating Cycles (Life) Mechanical, Min.</strong> — 100,000 cycles</td>
<td><strong>Operating Voltage, Nom.</strong> — 28 Vdc</td>
</tr>
<tr>
<td><strong>Inductive Rating</strong> — 120 Amps</td>
<td><strong>Dielectric Strength</strong> — All Circuits to Ground — 1,500 Vrms</td>
<td><strong>Pickup Voltage @ 25°C, Max.</strong> — Coil Type A and C — 18 Vdc</td>
</tr>
<tr>
<td><strong>Motor Rating</strong> — 80 Amps</td>
<td>Circuit to Circuit — 1,500 Vrms</td>
<td><strong>Dropout Voltage @ 25°C, Max.</strong> — Coil Type B — 15 Vdc</td>
</tr>
<tr>
<td><strong>Rupture Rating</strong> — 1,000 Amps</td>
<td>Coil to Ground and Aux. Contacts — 1,000 Vrms</td>
<td><strong>Coil Resistance ±20% @ 25°C</strong> — Coil Type A — N/A</td>
</tr>
<tr>
<td><strong>Altitude</strong> — D-31 — 50,000 ft</td>
<td><strong>Weight</strong> — 2.60 lbs</td>
<td>Coil Type B — 100 Ohms</td>
</tr>
<tr>
<td>DH-31, DHL-31 — 70,000 ft</td>
<td><strong>Coil Current @ 25°C, Max.</strong> — .350 Amp</td>
<td></td>
</tr>
</tbody>
</table>

**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.
HARTMAN Power Switching AC Contactors

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

Mounting Style A

Mounting Style B

Mounting Style C

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
D-31, DH-31, and DHL-31 Series, Rated up to 120 Amps, 115/200 VAC, 400 Hz (Continued)

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>Circuit Configuration 1</th>
<th>Circuit Configuration 2</th>
<th>Circuit Configuration 3</th>
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<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<td>D-31DB</td>
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<td>D-31TH</td>
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<td>A</td>
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<td>DH-31A</td>
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<td>DH-31DA</td>
<td>Hermetically Sealed</td>
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<td>B</td>
<td>4</td>
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<tr>
<td>DH-31DAA</td>
<td>Hermetically Sealed</td>
<td>A</td>
<td>A</td>
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<td>1616050-6</td>
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<tr>
<td>DHL-31B</td>
<td>Hermetically Sealed</td>
<td>B</td>
<td>D</td>
<td>6</td>
<td>1616050-9</td>
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</tbody>
</table>
HARTMAN Power Switching AC Contactors

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%

Circuit Configuration 1

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<tbody>
<tr>
<td>D-25BAH</td>
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<td>1616034-2</td>
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</table>
HARTMAN Power Switching AC Contactors

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.

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
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<td>B451</td>
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HARTMAN Power Switching AC Contactors

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

Product Facts
- 3PST NO, Double break
- Gasket sealed
- 253/440 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.
## Circuit Configurations

(Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
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<th>Tyco Electronics Part Number</th>
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</table>

Mounting Style A

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
KA175 Series, Rated up to 175 Amps, 115 or 230 VAC, 400-800 Hz

Lightweight, High Performance

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

Performance Data

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

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

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

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

Circuit Configuration 1

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
HARTMAN Power Switching AC Contactors

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

Circuit Configurations
(Consult factory for other available circuit configurations)

<table>
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<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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</table>

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

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.
## 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%

### Circuit Configurations

(Consult factory for other available circuit configurations)

### Circuit Configuration 1

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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</thead>
<tbody>
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<td>B-312CV</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>Continuous, Economizing</td>
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<td>1618004-5</td>
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For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

Catalog 5-1773450-5
Revised 9-08

www.tycoelectronics.com

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.

Dimensions are shown for reference purposes only. Specifications subject to change.
HARTMAN Power Switching AC Contactors

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

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

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<td>B-393T</td>
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<td>Continuous, Economizing</td>
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</table>
HARTMAN Power Switching AC Contactors

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

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
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.

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents. Specifications subject to change.
HARTMAN Power Switching AC Contactors

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

Circuit Configurations (Consult factory for other available circuit configurations)

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<th>HARTMAN Part Number</th>
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<th>Circuit Config.</th>
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<td>B-429CA</td>
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</tbody>
</table>
HARTMAN Power Switching AC Contactors

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

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
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<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<tr>
<td>B-430Z</td>
<td>Gasket/Vented</td>
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</table>
## 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**

<table>
<thead>
<tr>
<th><strong>Electrical Characteristics</strong></th>
<th><strong>Contact Arrangement</strong></th>
<th>3PDT, Magnetic Latching</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rated Operating Voltage</strong></td>
<td>115/200 VAC, 400 Hz, 3 phase</td>
<td></td>
</tr>
<tr>
<td><strong>Resistive Rating, Continuous</strong></td>
<td>500 Amps</td>
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</tr>
<tr>
<td><strong>Inductive Rating</strong></td>
<td>500 Amps</td>
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</tr>
<tr>
<td><strong>Interrupt Rating</strong></td>
<td>6,500 Amps</td>
<td></td>
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</table>

**General Characteristics**
- **Temperature Range** | -54°C to +71°C |
- **Operating Cycles (Life) at Rated Resistive Load, Min.** | 50,000 cycles |
- **Operating Cycles (Life) Mechanical, Min.** | 100,000 cycles |
- **Dielectric Strength**
  - All Circuits to Ground | 1,500 Vrms |
  - Circuit to Circuit | 1,500 Vrms |
  - Coil to Ground and Aux. Contacts | 1,000 Vrms |
- **Insulation Resistance, Initial** | 100 megohm min. |
- **Altitude** | 45,000 ft. |
- **Weight, Max.** | 4.5 lbs |

**Coil Characteristics**
- **Duty Cycle** | Continuous, self-deenergizing |
- **Close Voltage**
  - Min. | 15 Vdc |
  - Max. | 29 Vdc |
- **Trip Voltage**
  - Min. | 15 Vdc |
  - Max. | 29 Vdc |

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
**B-484 Series, Rated up to 500 Amps, 115/200 VAC, 400 Hz** (Continued)

**Mounting Style A**

**Mounting Style B**

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

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<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
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<th>Coil Type</th>
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<tbody>
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<td>B-484</td>
<td>Gasket/Vented</td>
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<td>B-484C</td>
<td>Gasket/Vented</td>
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K Series Connectors

Product Facts

- Lightweight
- 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

Tyco Electronics 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.
K Series, Rated up to 200 Amps, 28 Vdc

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

Performance Data

Electrical Characteristics

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

General Characteristics

Temperature Range —
40°C to +85°C

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

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

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

Insulation Resistance, Initial — 100 megohm min.

Altitude Max. — 50,000 ft.

Weight, Max. — .31-.41 lbs

Coil Characteristics

Duty Cycle —
AC (Type A, See diagram below), Economized (Type B, See diagram below), Economized with suppression (Type C, See diagram below), Continuous or Intermittent (Type D & F, See diagram below), Continuous or Intermittent with suppression (Type E & G, See diagram below)

Operating Voltage, Nom. —
28 Vdc

Pickup Voltage @ 20°C, Max. —
19 Vdc

Coil Type

A — Economized with Suppression

B — Electronic Economized with Suppression

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

Circuit Configurations (Consult factory for other available circuit configurations)

Circuit Configuration 1

Circuit Configuration 2
K Series, Rated up to 400 Amps, 28 Vdc

**Performance Data**

**Electrical Characteristics**

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

**General Characteristics**

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

**Coil Characteristics**

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

- **Operating Voltage, Nom.** — 28 Vdc
- **Pickup Voltage @ 250°C, Max.** —
  - Economized and continuous duty coil: 12 Vdc
  - Intermittent duty coil: 5 Vdc
- **Dropout Voltage, Max.** —
  - Economized and continuous duty: 7 Vdc
  - Intermittent duty: 5 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

**Coil Type**

- A — Economized with Suppression
- B — Continuous
- C — Intermittent

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For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
HARTMAN Lightweight High Performance DC Contactors

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

Mounting Style A

Mounting Style B

Mounting Style C

Mounting Style D

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

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents. Dimensions are shown for reference purposes only. Specifications subject to change.

USA: 1-800-522-6752
Canada: 1-905-470-4425
Mexico: 01-800-733-8926
C. America: 52-55-1106-0803
South America: 55-11-2103-6000
Hong Kong: 852-2735-1628
Japan: 81-44-844-8013
UK: 44-8706-080-208

www.tycoelectronics.com

Catalog 5-1773450-5
Revised 9-08
HARTMAN Lightweight High Performance DC Contactors

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

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

Circuit Configurations (Consult factory for other available circuit configurations)

![Circuit Configuration 1](Image)

![Circuit Configuration 2](Image)

![Circuit Configuration 3](Image)

![Circuit Configuration 4](Image)

![Circuit Configuration 5](Image)

![Circuit Configuration 6](Image)

![Circuit Configuration 7](Image)
HARTMAN Lightweight High Performance DC Contactors

K Series, Rated up to 500 Amps, 28 Vdc

![Image of HARTMAN Lightweight High Performance DC Contactors]

**Performance Data**

**Electrical Characteristics**

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

**General Characteristics**

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

**Coil Characteristics**

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

**Product Facts**

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

**Coil Type**

- A — Economized with Suppression

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
HARTMAN Lightweight High Performance DC Contactors

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

Circuit Configurations (Consult factory for other available circuit configurations)

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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

Circuit Configurations (Consult factory for other available circuit configurations)

Mounting Style A

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### 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td><img src="image1" alt="Continuous" /></td>
</tr>
<tr>
<td>B</td>
<td><img src="image2" alt="Continuous with Suppression" /></td>
</tr>
<tr>
<td>C</td>
<td><img src="image3" alt="Intermittent" /></td>
</tr>
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</table>

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
HARTMAN Power Switching DC Contactors

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

Mounting Style A

Mounting Style B

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

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>DH-14A</td>
<td>Hermetically Sealed</td>
<td>A</td>
<td>A</td>
<td>1</td>
<td>1616089-1</td>
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<tr>
<td>DH-14AL</td>
<td>Hermetically Sealed</td>
<td>B</td>
<td>A</td>
<td>2</td>
<td>1616089-2</td>
</tr>
<tr>
<td>DH-14AT</td>
<td>Hermetically Sealed</td>
<td>A</td>
<td>B</td>
<td>3</td>
<td>1616089-3</td>
</tr>
<tr>
<td>DH-21N*</td>
<td>Hermetically Sealed</td>
<td>C</td>
<td>C</td>
<td>4</td>
<td>1616026-2</td>
</tr>
</tbody>
</table>

*DH21N is a magnetically latched unit. Contacts will remain in position until the opposing coil is pulsed.
HARTMAN Power Switching DC Contactors

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

Product Facts
- 2 SPST, 1 NO, 1 NC, Electrically Latched
- 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

<table>
<thead>
<tr>
<th>Electrical Characteristics</th>
<th>General Characteristics</th>
<th>Coil Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Arrangement</td>
<td>Temperature Range</td>
<td>Duty Cycle</td>
</tr>
<tr>
<td>2 SPST, 1 NO, 1 NC, Electrically Latched</td>
<td>-55°C to +71°C</td>
<td>Continuous (Type A, See diagram below)</td>
</tr>
<tr>
<td>Rated Operating Voltage</td>
<td>Operating Cycles (Life) at Rated Resistive Load, Min.</td>
<td>or Continuous with suppression (Type B, See diagram below) or Continuous (Type C)</td>
</tr>
<tr>
<td>28 Vdc</td>
<td>50,000 cycles</td>
<td>Operating Voltage, Nom.</td>
</tr>
<tr>
<td>Resistive Rating</td>
<td>Operating Cycles (Life) Mechanical, Min.</td>
<td>Pickup Voltage @ 25°C, Max.</td>
</tr>
<tr>
<td>50 Amps</td>
<td>100,000 cycles</td>
<td>Drop Out Voltage @ 25°C, Max.</td>
</tr>
<tr>
<td>Inductive Rating</td>
<td>Dielectric Strength</td>
<td>Coil Current @ 25°C, Max.</td>
</tr>
<tr>
<td>25 Amps</td>
<td>All Circuits to Ground — 1,500 Vrms</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Circuit to Circuit — 1,500 Vrms</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coil to Ground and Aux. Contacts — 1,000 Vrms</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Altitude Max.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>— 50,000 ft.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Weight</td>
<td></td>
</tr>
<tr>
<td></td>
<td>— .72 to .94 lbs</td>
<td></td>
</tr>
</tbody>
</table>

Coil Type

A — Continuous  B — Continuous with Suppression  C — Continuous

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USA: 1-800-522-6752  Canada: 1-905-470-4425  Mexico: 01-800-733-8926  C. America: 82-55-1106-8003


Catalog 5-1773450-5  Revised 9-08  www.tycoelectronics.com
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
D-7, DH-7 and DH-18 Series, Rated up to 50 Amps, 28 Vdc (Continued)
### HARTMAN Power Switching DC Contactors

**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](image1)

![Circuit Configuration 2](image2)

![Circuit Configuration 3](image3)

![Circuit Configuration 4](image4)

![Circuit Configuration 5](image5)

![Circuit Configuration 6](image6)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-7AC</td>
<td>Gasket Sealed</td>
<td>A</td>
<td>A</td>
<td>1</td>
<td>1616088-1</td>
</tr>
<tr>
<td>D-7LHB</td>
<td>Gasket Sealed</td>
<td>C</td>
<td>A</td>
<td>2</td>
<td>1616064-1</td>
</tr>
<tr>
<td>DH-18DA*</td>
<td>Hermetically Sealed</td>
<td>D</td>
<td>C</td>
<td>3</td>
<td>1616050-2</td>
</tr>
<tr>
<td>DH-7ATK</td>
<td>Hermetically Sealed</td>
<td>B</td>
<td>B</td>
<td>4</td>
<td>1616089-7</td>
</tr>
<tr>
<td>DH-7MN</td>
<td>Hermetically Sealed</td>
<td>A</td>
<td>A</td>
<td>5</td>
<td>1616103-2</td>
</tr>
<tr>
<td>DH-7TB</td>
<td>Hermetically Sealed</td>
<td>E</td>
<td>A</td>
<td>6</td>
<td>1-1616089-3</td>
</tr>
</tbody>
</table>

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

---

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Mexico: 01-800-733-8926  
C. America: 55-55-1106-0803  
South America: 55-11-2103-6000  
Hong Kong: 852-2735-1628  
Japan: 81-44-844-8013  
UK: 44-8706-080-208
# HARTMAN Power Switching DC Contactors

## 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-1077D — 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
- **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.
HARTMAN Power Switching DC Contactors

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)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-1077DD</td>
<td>Gasket Sealed</td>
<td>A</td>
<td>Continuous</td>
<td>1</td>
<td>1616055-3</td>
</tr>
<tr>
<td>A-1077S</td>
<td>Gasket Sealed</td>
<td>B</td>
<td>Continuous, w/ Suppression</td>
<td>2</td>
<td>1616081-3</td>
</tr>
</tbody>
</table>
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

Duty Cycle — Continuous

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 — .650 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

Coil Characteristics

Circuit Configurations
(Consult factory for other available circuit configurations)

HARTMAN Power Switching DC Contactors

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

Duty Cycle — Continuous

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 — .650 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

Circuit Configurations
(Consult factory for other available circuit configurations)

HARTMAN Part Number | Construction Type | Mounting Style | Coil Type | Circuit Config. | Tyco Electronics Part Number
---|---|---|---|---|---
D-31BAA | Gasket/Vented | A | Continuous | 1 | 1616097-1
HARTMAN Power Switching DC Contactors

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

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

Performance Data

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

- Auxiliary Contacts
  - Aux. Contact Configuration — SPST
  - Voltage, Nom. — 28 Vdc
  - Resistive Rating — 0.1 Amps
  - Inductive Rating — 0.1 Amps
  - Lamp Rating — 0.1 Amps

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

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

Circuit Configuration 1

Circuit Configurations
(Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-32A</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>Continuous w/ Suppression</td>
<td>1</td>
<td>1616097-2</td>
</tr>
</tbody>
</table>

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South America: 55-11-2103-600
Hong Kong: 852-2735-1628
Japan: 81-44-844-8013
UK: 44-8706-080-208
HARTMAN Power Switching DC Contactors

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

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

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

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

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

Circuit Configurations
(Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>DH-25EA</td>
<td>Hermetically Sealed</td>
<td>A</td>
<td>Continuous</td>
<td>1</td>
<td>1616089-4</td>
</tr>
</tbody>
</table>

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South America: 55-11-2103-6000
Hong Kong: 852-2735-1628
Japan: 81-44-844-8013
UK: 44-870-080-208
HARTMAN Power Switching DC Contactors

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
Y1-Y2 — 0.19 Amp at 25°C

Circuit Configurations

(Consult factory for other available circuit configurations)

HARTMAN Part Number | Construction Type | Mounting Style | Coil Type | Circuit Config. | Tyco Electronics Part Number
--- | --- | --- | --- | --- | ---
DHR-31BA | Hermetically Sealed | A | Continuous | 1 | 1616096-1

Mounting Style A

Circuit Configuration 1

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
HARTMAN Power Switching DC Contactors

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

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

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

![Circuit Configuration 1](image1)
![Circuit Configuration 2](image2)
![Circuit Configuration 3](image3)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-1077D</td>
<td>Gasket Sealed</td>
<td>A</td>
<td>Intermittent</td>
<td>1</td>
<td>1616055-2</td>
</tr>
<tr>
<td>A-1077F</td>
<td>Gasket Sealed</td>
<td>B</td>
<td>Continuous</td>
<td>1</td>
<td>1616055-4</td>
</tr>
<tr>
<td>A-1077G</td>
<td>Gasket Sealed</td>
<td>C</td>
<td>Continuous</td>
<td>2</td>
<td>1616055-5</td>
</tr>
<tr>
<td>A-1077V</td>
<td>Gasket Sealed</td>
<td>D</td>
<td>Continuous</td>
<td>1</td>
<td>1616055-6</td>
</tr>
<tr>
<td>A-1077W</td>
<td>Gasket Sealed</td>
<td>E</td>
<td>Continuous</td>
<td>3</td>
<td>1616081-4</td>
</tr>
</tbody>
</table>

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
HARTMAN Power Switching DC Contactors

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

Circuit Configurations

(Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-876K</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>Intermittent</td>
<td>1</td>
<td>1616059-1</td>
</tr>
</tbody>
</table>
HARTMAN Power Switching DC Contactors

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

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-1077B</td>
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</table>

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
## HARTMAN Power Switching DC Contactors

### 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

<table>
<thead>
<tr>
<th><strong>Electrical Characteristics</strong></th>
<th><strong>Contact Arrangement</strong></th>
<th>SPST NO, Double Break</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rated Operating Voltage</strong></td>
<td></td>
<td>28 Vdc</td>
</tr>
<tr>
<td><strong>Resistive Rating</strong></td>
<td></td>
<td>300 Amps</td>
</tr>
<tr>
<td><strong>Motor Load</strong></td>
<td></td>
<td>300 Amps</td>
</tr>
<tr>
<td><strong>Rupture Rating</strong></td>
<td></td>
<td>3,000 Amps</td>
</tr>
</tbody>
</table>

#### 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.

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents. Specifications subject to change.
A-770 and AR-770 Series, Rated up to 300 Amps, 28 Vdc (Continued)
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
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
HARTMAN Power Switching DC Contactors

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

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<tbody>
<tr>
<td>A-770A</td>
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<tr>
<td>A-770B</td>
<td>Gasket/Vented</td>
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<td>Continuous</td>
<td>2</td>
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<tr>
<td>A-770C</td>
<td>Gasket/Vented</td>
<td>C</td>
<td>Continuous</td>
<td>3</td>
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<td>A-770D</td>
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<td>A-770WA-2</td>
<td>Gasket/Vented</td>
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<td>Intermittent</td>
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<td>4-1616058-2</td>
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<td>A-770WA-3</td>
<td>Gasket/Vented</td>
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<td>A-770WF</td>
<td>Gasket/Vented</td>
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<tr>
<td>AR-770W</td>
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</tr>
</tbody>
</table>

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
A-848 Series, Rated up to 300 Amps, 24/48 Vdc

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 — Intermitent
Operating Voltage, Max. — 31 Vdc
Operating Voltage, Min. — 18 Vdc
Pickup Voltage @ 25°C, Max., Initial — 12 Vdc
Dropout Voltage — 1.5 to 7 Vdc

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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</thead>
<tbody>
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<td>A-848KH</td>
<td>Gasket/Vented</td>
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<td>Intermittent</td>
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<td>A-848KH-2</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>Intermittent</td>
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<td>1616082-4</td>
</tr>
</tbody>
</table>
A-848 Series, Rated up to 300 Amps, 28 Vdc

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)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-848MAS</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>Continuous w/Supp., Economizing</td>
<td>1</td>
<td>1616102-2</td>
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<tr>
<td>A-848MLS</td>
<td>Gasket/Vented</td>
<td>B</td>
<td>Continuous w/Supp., Economizing</td>
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<td>1616102-3</td>
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<tr>
<td>A-848KLC</td>
<td>Gasket/Vented</td>
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<td>Continuous, Economizing</td>
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<td>1616082-6</td>
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</tbody>
</table>
HARTMAN Power Switching DC Contactors

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.

Dimensions are in inches unless otherwise specified. Values in brackets are metric equivalents.

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

USA: 1-800-522-6752  Canada: 1-905-470-4425  Mexico: 01-800-733-8926  C. America: 52-55-1106-0803


www.tycoelectronics.com
HARTMAN Power Switching DC Contactors

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

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

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>AH-965H</td>
<td>Hermetically Sealed A</td>
<td>A</td>
<td>Intermittent</td>
<td>1</td>
<td>1616084-1</td>
</tr>
</tbody>
</table>

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
A-400 Series, Rated up to 400 Amps, 28 Vdc

Performance Data

Electrical Characteristics
Contact Arrangement — SPST NO, Double Break
Rated Operating Voltage — 28 Vdc
Resistive Rating — 400 Amps
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
A-400G, A-400G-2 — 31 Vdc
A-400DC — 32 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
HARTMAN Power Switching DC Contactors

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

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

Mounting Style A

Mounting Style B

Mounting Style C

Mounting Style D

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.

Specifications subject to change.

Catalog 5-1773450-5
Revised 9-08
www.tycoelectronics.com

USA: 1-800-522-6752
Canada: 1-905-470-4425
Mexico: 01-800-733-8926
C. America: 52-55-1106-0803
South America: 55-11-2103-6000
Hong Kong: 852-2735-1628
Japan: 81-44-844-8013
UK: 44-8706-080-208
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.
HARTMAN Power Switching DC Contactors

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

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-400A</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>Intermittent</td>
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<td>1-1616530-6</td>
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<tr>
<td>A-400AA</td>
<td>Gasket/Vented</td>
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<td>Intermittent</td>
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<td>A-400B</td>
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<td>A-400L</td>
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<td>A-400S</td>
<td>Gasket/Vented</td>
<td>J</td>
<td>Continuous/Intermittent</td>
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</table>

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

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.

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

USA: 1-800-522-6752
Canada: 1-905-470-4425
Mexico: 01-800-733-8926
C. America: 55-11-1106-0803
South America: 55-11-2103-6000
Hong Kong: 852-2735-1628
Japan: 81-44-844-8013
UK: 44-8706-080-208

www.tycoelectronics.com
A-703 and AH-703 Series, Rated up to 400 Amps, 28 Vdc*

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. — 0.04 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 — 26 Vdc Nominal
Pickup Voltage @ 25°C, Max. —
A-703B — 8 Vdc
A-703DBH — 10 Vdc
A-703T — 13 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-703G, A-703GS, AH-703F — 1.5 to 7 Vdc

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. — 0.04 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 — 26 Vdc Nominal
Pickup Voltage @ 25°C, Max. —
A-703B — 8 Vdc
A-703DBH — 10 Vdc
A-703T — 13 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-703G, A-703GS, AH-703F — 1.5 to 7 Vdc
HARTMAN Power Switching DC Contactors

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

For factory-direct application, Contact US: 1-800-522-6752
For factory-direct application, 60x127 to 300x345
assistance, phone 419-521-9500 or fax 419-526-2749.

Mounting Style A

Mounting Style B

Mounting Style C

Mounting Style D

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.

Catalog 5-1773450-5 Revised 9-08

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

Mounting Style E

Mounting Style F
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
HARTMAN Power Switching DC Contactors

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

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
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<th>Coil Type</th>
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For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
HARTMAN Power Switching DC Contactors

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. — 16 Vdc
- Dropout Voltage @ 25°C — 1 to 10 Volts
- Coil Current, Inrush, Max. — 4.5 Amp
HARTMAN Power Switching DC Contactors

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

Circuit Configurations (Consult factory for other available circuit configurations)

Circuit Configuration 1

Circuit Configuration 2

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<th>HARTMAN Part Number</th>
<th>Construction Type</th>
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For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

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

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.
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 — SPOT, 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

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
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<th>HARTMAN Part Number</th>
<th>Construction Type</th>
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HARTMAN Power Switching DC Contactors

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.

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.

Dimensions are shown for reference purposes only. Specifications subject to change.
HARTMAN Power Switching DC Contactors

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

Circuit Configurations (Consult factory for other available circuit configurations)

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HARTMAN Power Switching DC Contactors

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

Circuit Configurations (Consult factory for other available circuit configurations)

Mounting Style A

__________________________________________________________________________

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<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
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<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<td>Intermittent</td>
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For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.

Catalog 5-1773450-5
Revised 9-08

www.tycoelectronics.com

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.

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

USA: 1-800-522-6752
Canada: 1-905-470-4425
Mexico: 01-800-733-8926
C. America: 82-55-1106-0803

South America: 55-11-2103-6000
Hong Kong: 852-2735-1628
Japan: 81-44-844-8013
UK: 44-8706-080-208
HARTMAN Power Switching DC Contactors

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

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
Resistances, Inrush ± 20% @ 25°C — 3 Ohm
Resistances, Hold ± 20% @ 25°C — 80 Ohm

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
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<tr>
<th>HARTMAN Part Number</th>
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<th>Mounting Style</th>
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HARTMAN Power Switching DC Contactors

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

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents. Dimensions are shown for reference purposes only. Specifications subject to change.

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
### HARTMAN Power Switching DC Contactors

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

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

![Circuit Configuration 1](image1)

![Circuit Configuration 2](image2)

<table>
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### HARTMAN Power Switching DC Contactors

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

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.

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

USA: 1-800-522-6752
Canada: 1-905-470-4425
Mexico: 01-800-733-8926
C. America: 92-55-1106-0803
South America: 55-11-2103-6000
Hong Kong: 852-2735-1628
Japan: 81-44-844-8013
UK: 44-8706-080-208

Catalog 5-1773450-5
Revised 9-08
www.tycoelectronics.com
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### 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.

### Circuit Configurations

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### Mounting Style A

![Mounting Style A Diagram]

### Circuit Configuration 1

![Circuit Configuration 1 Diagram]
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

Circuit Configurations (Consult factory for other available circuit configurations)

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

### Coils
- **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.

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

### Mounting Style A

### Specifications
- **HARTMAN Part Number**: E-387C-1
- **Construction Type**: Gasket/Vented
- **Mounting Style**: A
- **Coil Type**: Continuous
- **Circuit Config.**: 1
- **Tyco Electronics Part Number**: 2-1616126-3

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For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
A-700 Series Cutout — Reverse Current, Rated up to 100 Amps, 28 Vdc

Product Facts
- SPST NO
- Gasket sealed
- Auxiliary contacts available

Performance Data

Electrical Characteristics
- Main Contacts — SPST NO
- 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

Circuit Configurations (Consult factory for other available circuit configurations)

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

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-700BU</td>
<td>Gasket/Vented</td>
<td>A</td>
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<td>1616109-6</td>
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</tbody>
</table>
HARTMAN Sensors and Protective Devices

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

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-700AQ-4</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>Continuous</td>
<td>1</td>
<td>1616109-4</td>
</tr>
</tbody>
</table>
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** — 0.5 ± 0.15

**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
- **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

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
HARTMAN Sensors and Protective Devices

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

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-700AAP</td>
<td>Gasket/Vented</td>
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<tr>
<td>A-700ZC-7</td>
<td>Gasket/Vented</td>
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<td>Continuous</td>
<td>2</td>
<td>1616109-7</td>
</tr>
<tr>
<td>A-700ZG</td>
<td>Gasket/Vented</td>
<td>B</td>
<td>Continuous</td>
<td>3</td>
<td>1616109-9</td>
</tr>
</tbody>
</table>
HARTMAN Sensors and Protective Devices

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 Circuitsto 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

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

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents. Specifications subject to change.

USA: 1-800-522-6752
Canada: 1-905-470-4425
Mexico: 01-800-733-8926
C. America: 52-55-1106-0803

South America: 55-11-2103-6000
Hong Kong: 852-2735-1628
Japan: 81-44-844-8013
UK: 44-870-080-208

www.tycoelectronics.com

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

Mounting Style A

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

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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</thead>
<tbody>
<tr>
<td>A-701D</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>Continuous, Economizing</td>
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<tr>
<td>A-701C</td>
<td>Gasket/Vented</td>
<td>B</td>
<td>Continuous, Economizing</td>
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</tbody>
</table>
HARTMAN Sensors and Protective Devices

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
- Dielectric Strength — All Circuits to Ground — 1,250 Vrms
- Circuit to Circuit — 1,250 Vrms

Circuit Configurations (Consult factory for other available circuit configurations)

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

Coil Characteristics
- Duty Cycle
- Nom. Coil Voltage
- Pickup Voltage, Max.
- Dropout Voltage

HARTMAN

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

Mounting Style A

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

Catalog 5-1773450-5
Revised 9-08
www.tycoelectronics.com

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.

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

USA: 1-800-522-6752
Canada: 1-905-470-4425
Mexico: 01-800-733-8926
C. America: 52-55-1106-0803
South America: 55-11-2103-6000
Hong Kong: 852-2735-1628
Japan: 81-44-844-8013
UK: 44-8706-080-208

6–125
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

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-188MA-1</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>N/A</td>
<td>1</td>
<td>1618114-7</td>
</tr>
</tbody>
</table>
HARTMAN Sensors and Protective Devices

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-711AJ, A-711JM — 3 lbs 13 oz
- Signal Resistor — 20 Ohm ± 10%, 20 W
- Coils Resistor, “C” Term. to “GND” — 36 Ohm ± 10%

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

General Specifications
- Mounting Style A
- Mounting Style B

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
A-711 Series Relay, Automatic Dropout, Rated up to 600 Amps, 29 Vdc (Continued)

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<tr>
<td>A-711JF</td>
<td>Gasket/Vented</td>
<td>A</td>
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<td>1-1616109-6</td>
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<tr>
<td>A-711JM</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>Intermittent</td>
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<td>A-711Z</td>
<td>Gasket/Vented</td>
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<td>A-711R</td>
<td>Gasket/Vented</td>
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<td>1-1616109-8</td>
</tr>
</tbody>
</table>
HARTMAN Sensors and Protective Devices

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

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<tbody>
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<td>A-957CSD</td>
<td>Gasket/Vented</td>
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<td>A-957G</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>Continuous</td>
<td>2</td>
<td>1616110-8</td>
</tr>
</tbody>
</table>

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
A-957 Series Relay, Automatic Cutout, Rated up to 300 Amps, 24/30 Vdc

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

Performance Data

Electrical Characteristics

<table>
<thead>
<tr>
<th>Contact Arrangement</th>
<th>SPST NO, Double Break</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Voltage, Nom.</td>
<td>24/30 Vdc</td>
</tr>
<tr>
<td>Resistive Rating</td>
<td>300 Amps</td>
</tr>
<tr>
<td>Inrush Rating</td>
<td>800 Amps</td>
</tr>
</tbody>
</table>

Pickup Current
- VR — 24 V 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 |

Circuit Configurations

(Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<tbody>
<tr>
<td>A-957E</td>
<td>Gasket/Vented</td>
<td>A</td>
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<td>1616110-7</td>
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</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<tbody>
<tr>
<td>A-957CA</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>Continuous</td>
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<td>1616110-5</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Duty Cycle</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<tbody>
<tr>
<td>Q-50Y</td>
<td>Environmentally Sealed</td>
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<td>Continuous</td>
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<td>1-1616131-2</td>
</tr>
</tbody>
</table>

Mounting Style A

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

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Duty Cycle</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<tbody>
<tr>
<td>Q-50F</td>
<td>Environmentally Sealed</td>
<td>A</td>
<td>Continuous</td>
<td>1</td>
<td>1616131-9</td>
</tr>
</tbody>
</table>
Q-50 Series Relay, Current Indicator, Rated up to 6.25 Amps, 28 Vdc

Performance Data

Electrical Characteristics
- 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

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

Mounting Style A

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<tr>
<td>Q-50BB</td>
<td>Environmentally Sealed</td>
<td>A</td>
<td>Continuous</td>
<td>1</td>
<td>1616131-5</td>
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<td>Q-50BD</td>
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<td>1616131-6</td>
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<td>Q-50E</td>
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<td>Continuous</td>
<td>1</td>
<td>1616131-8</td>
</tr>
</tbody>
</table>

Circuit Configurations
(Consult factory for other available circuit configurations)

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

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

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Duty Cycle</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q-50A</td>
<td>Environmentally Sealed</td>
<td>A</td>
<td>Continuous</td>
<td>1</td>
<td>1616131-1</td>
</tr>
</tbody>
</table>

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

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Duty Cycle</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q-50CC</td>
<td>Environmentally Sealed</td>
<td>A</td>
<td>Continuous</td>
<td>1</td>
<td>1616131-7</td>
</tr>
</tbody>
</table>

Mounting Style A

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.
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

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Duty Cycle</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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</thead>
<tbody>
<tr>
<td>Q-50S</td>
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<td>1-1616131-1</td>
</tr>
<tr>
<td>Q-50Z</td>
<td>Environmentally Sealed</td>
<td>A</td>
<td>Continuous</td>
<td>2</td>
<td>1-1616131-3</td>
</tr>
</tbody>
</table>

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
# Q-50 Series Relay, Current Indicator, Rated up to 20 Amps, 28 Vdc

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

## Performance Data

### Electrical Characteristics

<table>
<thead>
<tr>
<th>Contact Arrangement</th>
<th>Contact Rating @ 28 Vdc</th>
<th>Lamp Load @ 28 Vdc</th>
<th>Operating Voltage, Nom.</th>
<th>Sensing Current Rating</th>
<th>Contact Rating@ 28 Vdc</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPST NC, SPST NO or SPST</td>
<td>Q-50AB-2 — 0.2 Amp</td>
<td>Q-50AC, Q-50AB-2 — 0.08 Amp</td>
<td>—</td>
<td>20 Amps continuous, max. except for Q-50AB-1 and Q-50AB-2 which are 10</td>
<td>Q-50AC 2 Amps continuous</td>
</tr>
<tr>
<td>Q-50J — 0.25 Amp</td>
<td>Q-50J — 0.25 Amp</td>
<td>Q-50J, Q-50AG — 0.20 Amp</td>
<td>—</td>
<td>—</td>
<td>Q-50AC 2 Amps continuous</td>
</tr>
<tr>
<td>Q-50AG — 1.0 Amp</td>
<td>Q-50AB-1 — 1 Amp switching, and 2 Amps carry</td>
<td>Q-50J, Q-50AG — 0.20 Amp</td>
<td>—</td>
<td>—</td>
<td>Q-50AC 2 Amps continuous</td>
</tr>
<tr>
<td>Q50AC — 2 Amp</td>
<td>Q50AC — 2 Amp</td>
<td>Q-50J — 0.5 Amp</td>
<td>—</td>
<td>—</td>
<td>Q-50AC 2 Amps continuous</td>
</tr>
</tbody>
</table>

### 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 A](image)

## Mounting Style B

![Mounting Style B](image)

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
Q-50 Series Relay, Current Indicator, Rated up to 20 Amps, 28 Vdc (Continued)

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Duty Cycle</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q-50U</td>
<td>Environmentally Sealed</td>
<td>A</td>
<td>Continuous</td>
<td>1</td>
<td>1-1616131-0</td>
</tr>
<tr>
<td>Q-50AC</td>
<td>Environmentally Sealed</td>
<td>B</td>
<td>Continuous</td>
<td>2</td>
<td>1616131-4</td>
</tr>
<tr>
<td>Q-50AG</td>
<td>Environmentally Sealed</td>
<td>A</td>
<td>Continuous</td>
<td>1</td>
<td>1616540-7</td>
</tr>
<tr>
<td>Q-50AB-1</td>
<td>Environmentally Sealed</td>
<td>A</td>
<td>Continuous</td>
<td>1</td>
<td>1616131-2</td>
</tr>
<tr>
<td>Q-50AB-2</td>
<td>Environmentally Sealed</td>
<td>A</td>
<td>Continuous</td>
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</table>

Circuit Configurations

Circuit Configuration 1

Circuit Configuration 2

Circuit Configuration 3
HARTMAN Sensors and Protective Devices

QR-50 Series Relay, AC Current Indicator, Rated up to 5 Amps, 115 VAC

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

Performance Data

Electrical Characteristics
- Contact Arrangement — SPST NC
- Resistive Rating @ 28 Vdc — 25 Amp
- Lamp Load @ 28 Vdc — 10 Amp
- Sensing Current Rating — 5 Amp, AC continuous

General Characteristics
- Temperature Range — -55°C to +85°C
- Altitude — 50,000 ft
- Weight, Max. — 25 lbs
- Operating Voltage, Nom. — 115 Vrms, 325-600 Hz
- Pickup Max. — 95 MA, AC
- Dropout Min. — 47 MA AC

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Duty Cycle</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>QR-50V</td>
<td>Environmentally Sealed</td>
<td>A</td>
<td>Continuous</td>
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<td>1616132-3</td>
</tr>
</tbody>
</table>

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

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.

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

USA: 1-800-522-6752
Canada: 1-905-470-4425
Mexico: 01-800-733-8926
C. America: 52-55-1106-0803

South America: 55-11-2103-6000
Hong Kong: 852-2733-1628
Japan: 81-44-844-8013
UK: 44-8706-080-208
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

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Duty Cycle</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>QR-50H</td>
<td>Environmentally Sealed</td>
<td>A</td>
<td>Continuous</td>
<td>1</td>
<td>1616132-1</td>
</tr>
</tbody>
</table>
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

Specifications:
- 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)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Duty Cycle</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
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<tbody>
<tr>
<td>E-316C</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>Continuous</td>
<td>1</td>
<td>1-1616126-4</td>
</tr>
</tbody>
</table>

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.
HARTMAN Sensors and Protective Devices

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.

Coil Type
- Continuous

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

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<tbody>
<tr>
<td>E-328-2</td>
<td>Gasket/Vented</td>
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<td>Continuous</td>
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<td>1-1616126-8</td>
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</tbody>
</table>

Mounting Style A

6-32 UNC-2A 4 STUDS

Circuit Configuration 1

AC
1
2
3
4
5
6
7
8
9
10
NEUT
GND
+28 VDC
VOLTAGE SENSOR
RELAY DRIVER

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

Circuit Configurations

(Consult factory for other available circuit configurations)

HARTMAN Construction Mounting Co il Circuit Tyco Electronics

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>TYPE</th>
<th>STYLE</th>
<th>CONFIG.</th>
<th>NUMBER</th>
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</thead>
<tbody>
<tr>
<td>A-772XTB</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>Continuous</td>
<td>1</td>
</tr>
</tbody>
</table>
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.

E-387C-1
Gasket/Vented
A
Continuous
1
2-1616126-3

Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-387C-1</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>Continuous</td>
<td>1</td>
<td>2-1616126-3</td>
</tr>
</tbody>
</table>

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

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South America: 55-11-2103-6000
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Japan: 81-44-844-8013
UK: 44-8706-080-208

www.tycoelectronics.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

Circuit Configurations (Consult factory for other available circuit configurations)

HARTMAN Sensors and Protective Devices

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

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South America: 55-11-2103-6000
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Japan: 81-44-844-8013
UK: 44-8706-080-208

Mounting Style A

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-700BU</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>Continuous</td>
<td>1</td>
<td>1616109-6</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Contact Arrangement</th>
<th>SPST NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Operating Voltage</td>
<td>28 Vdc</td>
</tr>
<tr>
<td>Current Rating, Continuous</td>
<td>200 Amps</td>
</tr>
<tr>
<td>Current Rating at 15 sec.</td>
<td>1,000 Amps</td>
</tr>
<tr>
<td>Current Rating at 1 min.</td>
<td>500 Amps</td>
</tr>
<tr>
<td>Current Rating at 5 min.</td>
<td>300 Amps</td>
</tr>
<tr>
<td>Interrupting Capacity</td>
<td>4,500 Amps</td>
</tr>
<tr>
<td>Reverse Current Setting*</td>
<td>6 to 17 Amps</td>
</tr>
<tr>
<td>Differential Voltage for Pickup</td>
<td>.85 ± .15 V</td>
</tr>
</tbody>
</table>

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

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-700AQ-4</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>Continuous</td>
<td>1</td>
<td>1616109-4</td>
</tr>
</tbody>
</table>

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
A-700 Series Cutout — Reverse Current, Rated up to 300 Amps, 28 Vdc

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 — 0.5 ± 0.15

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-700AP — 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

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

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents. Dimensions are shown for reference purposes only. Specifications subject to change.
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

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
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<tbody>
<tr>
<td>A-700AAP</td>
<td>Gasket/Vented</td>
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<td>A-700ZG</td>
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<td>Continuous</td>
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</table>
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 ± 0.15 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
A-701 Series Cutout — Reverse Current, Rated up to 400 Amps, 28 Vdc (Continued)

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<td>A-701D</td>
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<td>A-701C</td>
<td>Gasket/Vented</td>
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<td>Continuous, Economizing</td>
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</table>

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
A-702 Series Cutout — Reverse Current, Rated up to 600 Amps, 28 Vdc

Product Facts
- SPST NO
- Gasket sealed

Performance Data
Electrical Characteristics
Contact Arrangement — SPST NO, Double Break
Rated Operating Voltage — 28 Vdc
Resistive Rating — 600 Amps
Reverse Current Dropout — 18 to 35 Amps
Differential Pickup — 0.5 ± 0.15

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
Dielectric Strength —
All Circuits to Ground — 1,250 Vrms
Circuit to Circuit — 1,250 Vrms
Circuit 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

Circuit Configurations (Consult factory for other available circuit configurations)

Mounting Style A

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

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

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<td>B-188MA-1</td>
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</table>

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

**Dimensions**
- Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.
- Dimensions are shown for reference purposes only. Specifications subject to change.

**Contact Information**
- USA: 1-800-522-6752
- Canada: 1-905-470-4425
- Mexico: 01-800-733-8926
- C. America: 82-55-1106-0803
- UK: 44-8706-080-208

**Website**
- www.tycoelectronics.com

**Catalog** 5-1773450-5
**Revised** 9-08
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-711JF 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-711JM — 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.
A-711 Series Relay, Automatic Dropout, Rated up to 600 Amps, 29 Vdc (Continued)

Circuit Configurations (Consult factory for other available circuit configurations)

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<th>Construction Type</th>
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For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
A-957 Series Relay, Automatic Cutout, Rated up to 200 Amps, 28 Vdc

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

Performance Data

Electrical Characteristics
- Main Contacts
  - Contact Arrangement: SPST NO, Double Break
  - Operating Voltage, Nom.: 28 Vdc
  - Resistive Rating: 200 Amps
  - Inrush Rating: 300 Amps
- Pickup Current
  - VR: 21-24 V
  - I: 25 Amp Max.
  - SR: 18 V Max.
  - MC: 18 V Max.
- Dropout Current
  - I: 5 Amp Min.
  - SR: 18 ± 3 V
  - MC: 1 ± 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

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

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

<table>
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<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<td>A-957G</td>
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<td>Continuous</td>
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For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
A-957 Series Relay, Automatic Cutout, Rated up to 300 Amps, 24/30 Vdc

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

Performance Data

Electrical Characteristics

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

General Characteristics

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

Coil Characteristics

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

Circuit Configurations (Consult factory for other available circuit configurations)

| Circuit Configuration 1 |

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<td>A-957E</td>
<td>Gasket/Vented</td>
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</tbody>
</table>

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

Circuit Configurations
Consult factory for other available circuit configurations

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<td>Continuous</td>
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<td>1618110-5</td>
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</table>
## Q-50 Series Relay, Current Indicator, Rated up to 2 Amps, 28 Vdc

### 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

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

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Duty Cycle</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<td>Q-50Y</td>
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</table>

#### Mounting Style A

### Circuit Configuration 1

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

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
HARTMAN Sensors and Protective Devices

Product Facts

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

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

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

Circuit Configurations

- Consult factory for other available circuit configurations

Mounting Style A

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Duty Cycle</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<tr>
<td>Q-50F</td>
<td>Environmentally Sealed</td>
<td>A</td>
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<td>1</td>
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</table>

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
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: 0.8 Amps DC, Q50BB: 1.0 Amps DC, Q50E: 1.4 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

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<td>Q-50BD</td>
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Circuit Configurations
(Consult factory for other available circuit configurations)

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
Q-50 Series Relay, Current Indicator, Rated up to 10 Amps, 28 Vdc

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

Performance Data

Electrical Characteristics
- Contact Arrangement — SPST NO
- Contact Rating @ 28 Vdc — 0.25 Amp
- Lamp Load @ 28 Vdc — 0.08 Amp
- Rated Operating Voltage — 28 Vdc
- Sensing Current Rating — 20 Amps, continuous, max.

Pickup Max. — 3.5 Amps DC
Dropout Min. — 0.5 Amp

General Characteristics
- Temperature Range — -55°C to +71°C
- Altitude, Max. — 50,000 ft
- Weight, Max. — 1.25 oz

Mounting Style A

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Duty Cycle</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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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

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
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Mounting Style A
HARTMAN Sensors and Protective Devices

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

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

- Circuit Configuration 1
  - A2
  - A3
  - L1
  - L2

- Circuit Configuration 2
  - A1
  - A2
  - A3
  - L1
  - LOAD

**Specifications**

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<th>HARTMAN Part Number</th>
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</tbody>
</table>

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

Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.

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

USA: 1-800-522-6752
Canada: 1-905-470-4425
Mexico: 01-800-733-8926
C. America: 52-55-1106-0803
South America: 55-11-2103-6000
Hong Kong: 852-2735-1628
Japan: 81-44-844-8013
UK: 44-8706-080-208
HARTMAN Sensors and Protective Devices

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, Q-50AG — 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
- Q-50U, 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 A Diagram](image1)

### Mounting Style B

![Mounting Style B Diagram](image2)
HARTMAN Sensors and Protective Devices

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

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Duty Cycle</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q-50U</td>
<td>Environmentally Sealed</td>
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<td>Continuous</td>
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<td>Q-50AC</td>
<td>Environmentally Sealed</td>
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<td>Continuous</td>
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<td>Q-50AG</td>
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<td>1616540-7</td>
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<tr>
<td>Q-50AB-1</td>
<td>Environmentally Sealed</td>
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<td>Continuous</td>
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<td>Q-50AB-2</td>
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</table>

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
HARTMAN Sensors and Protective Devices

QR-50 Series Relay, AC Current Indicator, Rated up to 5 Amps, 115 VAC

Product Facts

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

Performance Data

Electrical Characteristics

Contact Arrangement — SPST NC
Resistive Rating @ 28 Vdc — .25 Amp
Lamp Load @ 28 Vdc — .10 Amp
Sensing Current Rating — 5 Amp, AC continuous

General Characteristics

Temperature Range — -55°C to +85°C
Altitude — 50,000 ft
Weight, Max. — .25 lbs
Operating Voltage, Nom. — 115 Vrms, 325-600 Hz
Pickup Max. — 95 MA, AC
Dropout Min. — 47 MA AC

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Duty Cycle</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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</thead>
<tbody>
<tr>
<td>QR-50V</td>
<td>Environmentally Sealed</td>
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<td>1616132-3</td>
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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: 0.08 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.: 0.19 lbs
- Sinusoidal Vibration: 10 G to 500 Hz

Circuit Configurations (Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Duty Cycle</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<td>QR-50H</td>
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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

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Duty Cycle</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<tbody>
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<td>E-316C</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>Continuous</td>
<td>1</td>
<td>1-1616126-4</td>
</tr>
</tbody>
</table>

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
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
- Shock for 11 msec, 1/2 Sine, 3 Axes — 30 G

Circuit Configurations (Consult factory for other available circuit configurations)
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

Circuit Configurations (Consult factory for other available circuit configurations)

HARTMAN Part Number | Construction Type | Mounting Style | Duty Cycle | Circuit Config. | Tyco Electronics 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.
### 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

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

#### Circuit Configuration 1

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA-3100D</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>Continuous, Economizing</td>
<td>1</td>
<td>1616133-1</td>
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<td>RA-3100M</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>Continuous, Economizing</td>
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<td>1616133-5</td>
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</tbody>
</table>
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**

<table>
<thead>
<tr>
<th>Contact Arrangement</th>
<th>3PST NO</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rated Operating Voltage</strong></td>
<td>115/208 VAC, 400-610 Hz, 3 phase</td>
</tr>
<tr>
<td><strong>Resistive Rating</strong></td>
<td>RA-3100J-1 - 110 Amp, RA-3100L - 50 Amp</td>
</tr>
<tr>
<td><strong>Motor Rating</strong></td>
<td>RA-3100J-1 - 110 Amp, RA-3100L - 50 Amp</td>
</tr>
<tr>
<td><strong>Rupture Rating</strong></td>
<td>RA-3100J-1 - 1,100 Amp, RA-3100L 500 Amp</td>
</tr>
<tr>
<td><strong>Shock for 10-12 msec</strong></td>
<td>50 G</td>
</tr>
<tr>
<td><strong>Closing Time, Max., Override at 28 Vdc</strong></td>
<td>35 msec</td>
</tr>
<tr>
<td><strong>Opening Time, Max., Override at 28 Vdc</strong></td>
<td>25 msec</td>
</tr>
<tr>
<td><strong>Contact Bounce, Max.</strong></td>
<td>3 msec</td>
</tr>
</tbody>
</table>

**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%** | 1.2 to 2.0 sec |
| **Trip Time @ 550 Amp Current +10%** | 0.34 to 0.65 sec |
| **Trip Time @ 1100 Amp Current +10%** | 0.07 to 0.20 sec |

**General Characteristics**

| Temperature Range | -55°C to +85°C |
| Operating Cycles (Life) at Rated Load, Min. | 50,000 cycles |
| Operating Cycles (Life) Mechanical, Min. | 100,000 cycles |
| Altitude | 60,000 ft |
| Weight, Max. | 1.55 lbs |

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

**HARTMAN Construction Mounting Coil Circuit Tyco Electronics Part Number**

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<tbody>
<tr>
<td>RA-3100J-1</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>Continuous, Economizing</td>
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<td>1616133-3</td>
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<tr>
<td>RA-3100L</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>Continuous, Economizing</td>
<td>1</td>
<td>1616133-4</td>
</tr>
</tbody>
</table>

For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
RA-3100 Series Remote Power Controller, Rated up to 60 Amps, 115/208 VAC

Product Facts
- 3PST NO
- Gasket sealed

Performance Data

Electrical Characteristics
- Contact Arrangement — 3PST NO
- Rated Operating Voltage — 115/208 VAC, 400-610 Hz, 3 phase
- Resistive Rating — 50 Amp
- Motor Rating — 30 Amp
- Rupture Rating — 1000 Amp
- Closing Time, Max., Override at 28 Vdc — 35 msec
- Opening Time, Max., Override at 28 Vdc — 25 msec
- Contact Bounce, Max. — 3 msec

Coil Characteristics
- Duty Cycle — Continuous, economizing
- Operating Voltage, Max. — 32 Vdc
- Operating Voltage @ 85°C, Min. — 18 Vdc
- Trip Time @ 60 Amp Current +10% — 2.0 to 3.0 sec
- Trip Time @ 75 Amp Current +10% — 1.0 to 1.9 sec
- Trip Time @ 95 Amp Current +10% — 2 to 9 sec
- Trip Time @ 200+ Amp Current +10% — 0.01 to 0.1 sec

General Characteristics
- Temperature Range — -55°C to +85°C
- Operating Cycles (Life) Mechanical, Min. — 100,000 cycles
- Altitude — 50,000 ft
- Weight, Max. — 1.55 lbs

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<tbody>
<tr>
<td>RA-3100H</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>Continuous, Economizing</td>
<td>1</td>
<td>1616539-3</td>
</tr>
</tbody>
</table>

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

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

**Circuit Configuration 1**

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
</tr>
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<tbody>
<tr>
<td>RA-3100F</td>
<td>Gasket/Vented</td>
<td>A</td>
<td>Continuous, Economizing</td>
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<td>1616133-2</td>
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</tbody>
</table>
HARTMAN Sensors and Protective Devices

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.

Circuit Configurations

(Consult factory for other available circuit configurations)

<table>
<thead>
<tr>
<th>HARTMAN Part Number</th>
<th>Construction Type</th>
<th>Mounting Style</th>
<th>Coil Type</th>
<th>Circuit Config.</th>
<th>Tyco Electronics Part Number</th>
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<tbody>
<tr>
<td>E-308TA</td>
<td>Gasket/Vented</td>
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<td>Continuous</td>
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<td>1616128-6</td>
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For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.
<table>
<thead>
<tr>
<th>Main Current Rating</th>
<th>AC/DC</th>
<th>Core Rating</th>
<th>Main Contact Config.</th>
<th>Operating Mode</th>
<th>Aux. Contact Config.</th>
<th>Coil Voltage (VDC)</th>
<th>Seal Type</th>
<th>Duty Cycle</th>
<th>Coil Trans. Voltage</th>
<th>Hartman Part No.</th>
<th>Tyco Electronics Part No.</th>
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<tbody>
<tr>
<td>10 DC</td>
<td>28</td>
<td>DPDT</td>
<td>Side Stable</td>
<td>—</td>
<td>115V</td>
<td>Gasket/Vented</td>
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<td>SPDT</td>
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<td>Side Stable</td>
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<td>SPST NO</td>
<td>Side Stable</td>
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<td>28</td>
<td>Gasket/Vented</td>
<td>Cont.</td>
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For factory-direct application assistance, phone 419-521-9500 or fax 419-526-2749.