Hybrid & Electric Mobility Solutions
Product Overview
PUT THE POWER ON THE ROAD

TE Connectivity (TE) provides a complete line of connectors, relays, harnesses, contactors and disconnects to safely connect and protect the flow of data and power around your hybrid or electric vehicle.

TE’s automotive products have been proven in light and heavy-duty vehicles and our technologies leverage decades of experience with high-voltage generation, transmission and distribution. So you can depend on them to be safe and reliable in your application.

BATTERY TECHNOLOGIES

Protecting by design. Connection after connection. TE’s innovative cell-to-cell, module-to-module, and battery-to-car solutions are addressing the big challenges of hybrid and electric vehicles.

With continuous research into new technologies, collaborative engineering with customers, and lower-mass off-the-shelf solutions, we’re making a difference with your power-to-weight-ratio, time-to-recharge, and total range capabilities.

Our technologies leverage decades of experience with high-voltage generation, transmission and distribution and you can depend on them to be safe and reliable in your application.

CHARGING SOLUTIONS

Mobility simplified. One charge at a time. TE is helping enable electric mobility by creating safe, high-quality components for every part of the charging station - and making them affordable. Our experience with high-voltage energy distribution and Smart-Grid technology gives us insight into the needs of this important market segment. More than a complete charging solution.

A smart one. Smart charging solutions enable customers to meter their EV’s electricity consumption, and communicate data via innovative smart charging cords and inlets. You supply the shell, we’ll supply everything else. TE has everything it takes to create your charging solution, except the box it goes in. From cables to contactors, meters to card readers, screens to sockets, we’ve already solved how it all goes together.
IN-VEHICLE TECHNOLOGY

TE provides a complete line of connectors, relays, harnesses, contactors and disconnects to safely connect and protect the flow of data and power around your hybrid or electric vehicle. TE’s automotive products have been proven in light and heavy-duty vehicles and our technologies leverage decades of experience with high-voltage generation, transmission and distribution.

So you can depend on them to be safe and reliable in your application. Our AMP+ line of cables, connectors, harnesses and terminals safely and reliably channel high- and low-voltage power in and around the battery and vehicle, to help you put the power to the road.

INFRASTRUCTURE SOLUTIONS

Completing the connections that power it all. More than 50 years of experience with high-voltage electricity separates us from automotive engineering companies in the hybrid and EV industry.

We’re using that knowledge to help create smarter, better, easier ways to connect the grid to drivers - and give them the mobility they need. Before everyone can embrace driving hybrid and electric vehicles, we need a safe, reliable way to get the power from the grid to the chargers, and into the batteries.

TE’s broad array of energy and industrial technologies have seen decades of real-world use connecting and protecting the flow of power around the world. So you can depend on them to be safe and reliable in your application, too.
### IP Code

Elements and Significance acc. to IEC 60529 and DIN 40050

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<th>1st Digit</th>
<th>Against Foreign Objects (incl. Dust)</th>
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<td>1</td>
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<td>2</td>
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</tr>
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<td>3</td>
<td>Protected against solid objects greater than 2.5 mm (ex. tool).</td>
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<td>4</td>
<td>Protected against solid objects greater than 1.0 mm (ex. wire).</td>
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<td>Dust protected.</td>
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<tr>
<td>6K</td>
<td>Dust tight.</td>
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<td>2nd Digit</td>
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<td><img src="image1.png" alt="1.png" /> Protected against vertically dripping water.</td>
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<td>2</td>
<td><img src="image2.png" alt="2.png" /> Protected against dripping water when tilted up to 15°.</td>
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<td><img src="image3.png" alt="3.png" /> Protected against spraying water (up to 60° inclination).</td>
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<td><img src="image4.png" alt="4.png" /> Protected against splashing water.</td>
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<td>4K</td>
<td><img src="image4K.png" alt="4K.png" /> Protected against splashing water with increased pressure.</td>
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Quality Guidelines

**Good Crimp Quality**

- **Bellmouth permissible** Bellmouth must always be present
- **Cut-off tab present**
- **Insulation visible**
- **Conductor visible**
- **Locking lances and terminal body not deformed**
- **Anvil imprint symmetrical**
- **Crimp barrel closed** Insulation is securely held
- **Crimp legs overlap** Insulation is securely held
- **Crimp legs must pass each other** Insulation is securely held

**Correct selection**
- of wire, terminal and applicator

- **Crimp heights and tolerances**
  - For crimp height tolerances for any given contact, please refer to the relevant application specification.
  - **Examples**
    - **Contact** P/N | Wire Range | Tolerance | Spec.
    - **JPT** 927775 | 0.50–1.00 mm² | ±0.05 mm | 114-18050
    - **JPT** 927773 | 1.50–2.50 mm² | ±0.05 mm | 114-18050
    - **MGS** 962885 | 0.20–0.50 mm² | ±0.05 mm | 114-18025

- **Insulation must be securely held after bend test (one bend cycle)**

**Test**

- Digital crimp height micrometer (0.001 mm increments) according to DIN ISO 9001
  - Part number: 547205-1

PAGE VI
Incorrect Crimp Quality

- Terminal body damaged
- Single core crimped on terminal
- Terminal twisted
- Cut off tab too long
- Crimp barrel distorted
- Insulation is pierced
- Crimp legs do not overlap
- Insulation is over crimped
- Conductor brush protrudes into terminal body
- Insulation inside the wire crimp
- Wire bent
- Terminal bent

Correct
Incorrect
Test
RoHS* Ready
* Restriction on the Use of Hazardous Substances (RoHS)

At TE Connectivity, we support your RoHS requirements. We’ve assessed more than 1.5 million end items/components for RoHS compliance, and issued new part numbers where any change was required to eliminate the restricted materials. Part numbers in this catalog are identified as:

**RoHS Compliant**

Part numbers in this catalog are RoHS Compliant, unless marked otherwise. These products comply with European Union Directive 2002/95/EC as amended 1 January 2006 that restricts the use of lead, mercury, cadmium, hexavalent chromium, PBB, and PBDE in certain electrical and electronic products sold into the EU as of 1 July 2006.  

Note: For purposes of this Catalog, included within the definition of RoHS Compliant are products that are clearly “Out of Scope” of the RoHS Directive such as hand tools and other non-electrical accessories.

**Non-RoHS Compliant**

These part numbers are identified with a “t” symbol. These products do not comply with the material restrictions of the European Union Directive 2002/95/EC.

**5 of 6 Compliant**

A “l” symbol identifies these part numbers. These products do not fully comply with the European Union Directive 2002/95/EC because they contain lead in solderable interfaces (they do not contain any of the other five restricted substances above allowable limits). However, these products may be suitable for use in RoHS applications where there is an application-based exception for lead in solders, such as the server, storage, or networking infrastructure exemption.

Note: Information regarding RoHS compliance is provided based on reasonable inquiry of our suppliers and represents our current actual knowledge based on the information provided by our suppliers. This information is subject to change. For latest compliance status, refer to our website referenced below. So whatever your questions when it comes to RoHS, we’ve got the answers at [http://www.TE.com/customersupport/rohssupportcenter/](http://www.TE.com/customersupport/rohssupportcenter/)

**Getting the information you need**

Our comprehensive on-line RoHS Customer Support Center provides a forum to answer your questions and support your RoHS needs. A RoHS FAQ (Frequently Asked Questions) is available with links to more detailed information. You can also submit RoHS questions and receive a response within 24 hours during a normal work week. The Support Center also provides:

- Cross-Reference from Non-compliant to Compliant Products
- Ability to browse RoHS Compliant Products in our on-line catalog: [www.TE.com/commerce/alt/RohsAltHome.do](http://www.TE.com/commerce/alt/RohsAltHome.do)
- Downloadable Technical Data Customer Information Presentation
- More detailed information regarding the definitions used above
Remark: Starting from 0.03 mm² (AWG 32) a wire can be crimped.

### Conversion Tables

#### AWG Conversion Table (Average Value)

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Most of the wire size ranges are mentioned in mm², as well as the insulation diameters which are in many cases only in mm’s. We therefore included the conversion tables on page X and page XI.

Please note that wire and insulation sizes are for guidance only. Consult the customer drawing for precise detail.

**FLK and FLR**

stand for German DIN (72551) abbreviations.

**FLK means:**

In German:
- Fahrzeug-Leitung Kunststoff
In English:
- Vehicle Cable Plastic

**FLR means:**

In German:
- Fahrzeug-Leitung reduziert
In English:
- Thin Walled Cable (reduced insulation thickness)
## Hybrid & Electric Mobility Solutions

### Product Overview

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<thead>
<tr>
<th>AMP+ HVA 280</th>
<th>Page</th>
<th>Powertrain Systems</th>
<th>Safety &amp; Security Systems</th>
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<th>Body &amp; Chassis Systems</th>
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<th>Powertrain Systems</th>
<th>Safety &amp; Security Systems</th>
<th>Convenience</th>
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<th>Body &amp; Chassis Systems</th>
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## Hybrid & Electric Mobility Solutions

### Product Overview

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<th>Powertrain Systems</th>
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# Hybrid & Electric Mobility Solutions

## Product Overview

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<th>Powertrain Systems</th>
<th>Safety &amp; Security Systems</th>
<th>Convenience</th>
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<td><strong>Mini K HV Precharge Relays</strong></td>
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<th>Driver Information</th>
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<th>Body &amp; Chassis Systems</th>
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<td>Imprint</td>
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Unique design improves manufacturability and packaging. TE’s AMP+ low-medium current connectors and headers HVA 280 are finger-proof, touch-safe 2- or 3-position connectors and headers, designed for great flexibility for hybrid and electric vehicle device applications. The connector system provides multiple latching options and an integrated internal HVIL, allowing for package size optimization and routing flexibility. In addition, the HVA 280 product family includes a discrete header design unique to the industry that improves packaging and manufacturing efficiency with a two-stage floating latch that creates safety in the system.

The HVA 280 family offers over 3,000 combination options providing solutions for a wide variety of device and wire harness applications like battery pack, DC/DC converter, on-board charger, electric heater, electric climate compressor, and high voltage power distribution.

### Naming Convention

**HVA 280 - 2p h i XEVR**

- **H**: High Voltage
- **V**: Voltage
- **A**: Accessory
- **E**: (≤ 100 A, DC-DC Conv., HVAC, etc.)
- **X**: Terminal System or Tab Size Indicator
- **O**: 280 = AMP MCP 2.8

- **i**: Discrete
- **m**: Multicore
- **x**: N/A

- **h**: Present
- **x**: Not Present or N/A

- **Number of Positions (2p or 3p)**
HEMS Product Overview

AMP+ HVA 280

Applications

- **Pin Number:** 2 (+2 HVIL)
- **Contact System:**
  - 2.8 mm AMP MCP
- **Conductor Cross-Sections:**
  - 3.0 mm² and 4.0 mm², individually shielded
- **Voltage Range:**
  - 600V DC
- **Operation Temperature:**
  - -40 °C up to 125 °C
- **Current Carrying Capacity:**
  - 40 A at 85 °C
  - 27 A @ 125 °C
- **IP Rating:**
  - Plugged: IP67, IP6k9k
  - Unplugged: IP2XB
- **HVIL:**
  - Integrated, internal
- **Latch Access Type:**
  - Finger access
- **CPA:**
  - No
- **Fire Classification:**
  - HB
- **Vibration Level:**
  - V1
- **Product Specification:**
  - 108-2394
- **Application Specification:**
  - 114-13259

* Drawing Number is NOT the Order Number!
**AMP+ HVA 280**

### Technical Features

- **Pin number:** 2 (+2 HVIL)
- **Contact System:** 2.8 mm AMP MCP
- **Conductor Cross-Sections:** 3.0 mm², 4.0 mm² individually shielded
- **Voltage Range:** 600V DC
- **Operation Temperature:** -40 °C up to 125 °C
- **Current Carrying Capacity:** 40A at 85 °C
- **IP Rating:**
  - Plugged: IP67, IP6k9k
  - Unplugged: IP2XB
- **HVIL:** Integrated, internal
- **Latch Access Type:** Finger and tool accessible
- **CPA:** With/Without
- **Fire Classification:** HB
- **Vibration Level:** V1
- **Shielding:** 360 deg
- **Available Keys:** A, B, D, E, F, G
- **Product Specification:** 108-2394
- **Application Specification:** 114-13259

---

* Drawing Number is NOT the Order Number!
AMP+ HVA 280 - 2 phm Shunted HVIL Plug (Multi-Core Cable)

Technical Features

- Pin Number: 2 (+2 HVIL)
- Contact System: 2.8 mm AMP MCP
- Conductor Cross-Sections: 2 x 4.0 mm², multi-core shielded
- Voltage Range: 850 VDC
- Operation Temperature: -40°C up to 140°C
- Current Carrying Capacity: 33A at 85°C
- IP Rating: Plugged: IP67, IP6k9k Unplugged: IP2XB
- HVIL: Integrated, internal
- Latch Access Type: Finger and tool accessible
- CPA: With
- Fire Classification: ./. (Vibration Level: AK Severity 2 (body-sealed)
- Shielding: 360 deg
- Available Keys: A, B, D, E, F
- Product Specification: 108-32020
- Application Specification: 114-13305

* Drawing Number is NOT the Order Number!
AMP+ HVA 280 - 2 phm - Pass Through HVIL Plug (Multi-Core Cable)

**Technical Features**

**Pin Number:**
2 (+2 HVIL)

**Contact System:**
2.8 mm AMP MCP

**Conductor Cross-Sections:**
2 x 4.0 mm² + 2 x 0.5 mm², multi-core shielded

**Voltage Range:**
850V DC

**Operation Temperature:**
-40 °C up to 140 °C

**Current Carrying Capacity:**
33A at 85 °C

**IP Rating:**
Plugged: IP67, IP6k9k
Unplugged: IP2XB

**HVIL:**
Integrated, internal

**Latch Access Type:**
Finger and tool accessible

**CPA:**
With

**Fire Classification:**
/.+

**Vibration Level:**
AK Severity 2 (body-sealed)

**Shielding:**
360 deg

**Available Keys:**
A, B, D, E, F

**Product Specification:**
108-32020

**Application Specification:**
114-13310

---

* Drawing Number is NOT the Order Number!
AMP+ HVA 280 - 2 pxx Intelligent Plug (Single Click)

Technical Features

**Pin number:**
2 HVIL only

**Operation temperature:**
-40 °C to 125 °C

**IP rating:**
Plugged: IP67, IP6k9k
Unplugged: IP2XB

**HVIL:**
Integrated, internal

**Latch Access Type:**
Finger accessible

**CPA:**
With

**Fire classification:**
HB

**Vibration Level:**
AK Severity 2 (body-sealed)

**Shielding:**
360 deg

**Available Keys:**
Z

**Product Specification:**
108-2394

**Application Specification:**
114-13259

* Drawing Number is NOT the Order Number!
Technical Features

**Pin Number:**
2 (+2 HVIL) or 3

**Contact System:**
2.8 mm AMP MCP

**Voltage Range:**
up to 850V DC (depends on the mating plug)

**Operation Temperature:**
-40°C up to 140°C

**Current Carrying Capacity:**
40 A at 85°C
23 A at 85°C for 3 positions

**IP Rating:**
Plugged: IP67, IP6k9k
Unplugged: IP2XB

**HVIL:**
/.

**Fire Classification:**
HB

**Vibration Level:**
V1

**Shielding:**
360 deg

**Available Shielding:**
Tin/Silver

**Available Keys:**
A, B, D, E, F

**Product Specification:**
108-32045

**Instruction Sheet:**
408-32095

---

**AMP+ HVA 280 - 2 phi - Plastic (Discrete) - Header 2phi /3pxi**

---

**Drawing 2103247**

---

**AMP+ HVA 280 - 2 phi - Plastic (Discrete) - Header 2phi /3pxi**

---

**Drawing 2103245**

---

**Mating Plugs**

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<tr>
<td>3P Header</td>
<td>12, 13</td>
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</table>

* Drawing Number is NOT the Order Number! For interface requirements please refer to product drawing.
AMP+ HVA 280 - 2 phx - Plastic (1-piece) - Header

Technical Features

**Pin Number:**
2 (+2 HVIL)

**Contact System:**
2.8 mm AMP MCP contact system

**Voltage Range:**
up to 850V DC (depends on the mating plug)

**Operation Temperature:**
-40 °C up to 140 °C

**Current Carrying Capacity:**
40A at 85 °C

**IP Rating:**
- Plugged: IP67, IP6k9k
- Unplugged: IP2XB

**HVIL:**
Integrated, internal

**Fire Classification:**
HB

**Vibration Level:**
AK Severity 2 (Body-Sealed)

**Shielding:**
360 deg

**Available Shielding:**
Tin/Silver

**Available Keys:**
A,B,D,E,F

**Product Specification:**
108-32020

**Instruction Sheet:**
408-10441

---

* Drawing Number is NOT the Order Number! For interface requirements please refer to product drawing.
Technical Features

**Pin Number:**
2 (+2 HVIL)

**Contact System:**
2.8 mm AMP MCP contact system

**Conductor Cross-sections:**
2 x 3.0 mm² or 2 x 4.0 mm²

**Voltage Range:**
600 V

**Operation Temperature:**
-40 °C up to 125 °C

**Current Carrying Capacity:**
40A at 85 °C

**IP Rating:**
Plugged: IP67, IP6k9k
Unplugged: IP2XB

**HVIL:**
Integrated, external

**Fire Classification:**
HB

**Vibration Level:**
V1

**Shielding:**
360 deg

**Available Keys:**
A, B, D, E, F

**Product Specification:**
In progress

**Application Specification:**
114-32033

* Drawing Number is NOT the Order Number!
Technical Features

**Pin Number:**
2 (+2 HVIL)

**Contact System:**
2.8 mm AMP MCP contact system

**Conductor Cross-sections:**
2 x 4.0 mm² + 2 x 0.5 mm², multi-core shielded

**Voltage Range:**
850 VDC

**Operation Temperature:**
-40 °C up to 140 °C

**Current Carrying Capacity:**
33 A at 85 °C

**IP Rating:**
Plugged: IP67, IP6k9k
Unplugged: IP2XB

**HVIL:**
Integrated, internal

**Fire Classification:**
HB

**Vibration Level:**
V1

**Shielding:**
360 deg

**Available Keys:**
A, B, D, E, F

**Application Specification:**
114-32034

---

* Drawing Number is NOT the Order Number!
**Technical Features**

**Pin Number:**
For 2-bay header: 2x (2+2 HVIL) or 6 (depends on selection of inner housing)
For 3-bay header: 3x (2+2 HVIL) or 9 (depends on selection of inner housing)

**Contact System:**
2.8 mm AMP MC

**Conductor Cross-Sections:**
4 mm²

**Voltage Range:**
up to 850V DC (depends on the mating plug)

**Operation Temperature:**
-40°C up to +125°C

**Current Carrying Capacity:**
up to 40 A @ 85°C (depends on the mating plug)

**IP Rating:**
Plugged: IP67, IP6k9k
Unplugged: IP2XB

**HVIL:**
.

**Fire Classification:**
HB

**Vibration Level:**
V1

**Shielding:**
360 deg

**Available Keys:**
For 2 bay header:
Option 1: A, E
Option 2: D, F
For 3 bay header:
A, D, E

**Inner Housing**
For 2 positions: 2103245-X
For 3 positions: 2103321-X

---

**Mating Plugs**

2P Header: page 3, 4, 5, 6
3P Header: page 12, 13

* Drawing Number is NOT the Order Number! For interface requirements please refer to product drawing.
AMP+ HVA 280 3PX – XE Plug

Technical Features

Pin Number:
3

Contact System:
2.8 mm AMP MCP

Conductor Cross-Sections:
2 x 4.0 mm² + 3 x 2.5 mm², multi-core shielded

Voltage Range:
850V DC

Operation Temperature:
-40 °C up to 140 °C

Current Carrying Capacity:
24 A @ 85°C

IP Rating:
Plugged: IP67, IP6k9k
Unplugged: IP2xkB

HVIL:
/. /

Fire Classification:
HB

Vibration Level:
V1

Available Keys:
A, B, D, E, F, and AK Severity 2
(Body-Sealed)

Product Specification:
108-32020

Application Specification:
114-32056

* Drawing Number is NOT the Order Number!
**Technical Features**

**Pin Number:**
3

**Contact System:**
2.8 mm AMP MCP

**Conductor Cross-Sections:**
2 x 4.0 mm² + 3 x 2.5 mm², multi-core shielded

**Voltage Range:**
850V DC

**Operation Temperature:**
-40 °C up to 140 °C

**Current Carrying Capacity:**
24 A @ 85°C

**IP Rating:**
Plugged: IP67, IP6k9k
Unplugged: IP2xB

**HVIL:**
./.

**Fire Classification:**
HB

**Vibration Level:**
V1

**Available Keys:**
A, B, D, E, F

**Product Specification:**
108-32077

**Application Specification:**
114-32125

* Drawing Number is NOT the Order Number!
**AMP+ HVA 280**

**Technical Features**

- **Pin Number:** 2(+2 HVIL)
- **Contact System:** 2.8 mm AMP MCP
- **Conductor Cross-Sections:** 2x4.0 mm² + 2x0.5 mm², mult-core shielded
- **Voltage Range:** 850V DC
- **Operation Temperature:** -40 °C up to 140 °C
- **Current Carrying Capacity:** 33A at 85 °C
- **IP rating:**
  - Plugged: IP67, IP6k9k
  - Unplugged: IP2XB
- **HVIL:** Integrated, internal
- **Fire Classification:** HB
- **Vibration Level:**
  - AK Severity 2 (body-sealed)
  - and V1
- **Product Specification:** 108-32077
- **Application Specification:** 114-32124
- **Available Keys:** A, B, D, E, F

*Drawing Number is NOT the Order Number!*
**Technical Features**

**AMP+ HVA 280 2PHM Shunted Plug (Single Click)**

- **Pin Number:** 2 (+2 HVIL)
- **Contact System:** 2.8 mm AMP MCP
- **Conductor Cross-Sections:** 2x4.0 mm², multi-core shielded
- **Voltage Range:** 850V DC
- **Operation Temperature:** -40 °C up to 140 °C
- **Current Carrying Capacity:** 33A at 85 °C
- **IP rating:**
  - Plugged: IP67, IP6k9k
  - Unplugged: IP2XB
- **HVIL:** Integrated, internal
- **Fire Classification:** HB
- **Vibration Level:**
  - AK Severity 2 (body-sealed) and V1
- **Product Specification:** 108-32077
- **Application Specification:** 114-32123
- **Available Keys:** A, B, D, E, F

*Drawing Number is NOT the Order Number!*
**Technical Features**

**Pin Number:**
2 (+2 HVIL)

**Contact System:**
2.8 mm AMP MCP

**Conductor Cross-Sections:**
3.0 mm² and 4.0 mm², individually shielded

**Voltage Range:**
600V DC

**Operation Temperature:**
-40 °C up to 125 °C

**Current Carrying Capacity:**
40A at 85 °C

**IP rating:**
Plugged: IP67, IP6k9k
Unplugged: IP2XB

**HVIL:**
Integrated, internal

**Fire Classification:**
HB

**Vibration Level:**
V1

**Product Specification:**
tbd

**Application Specification:**
tbd

**Available Keys:**
A, B, D, E, F, G

* Drawing Number is NOT the Order Number!
**Technical Features**

- **Pin Number:** 2 (+2 HVIL)
- **Contact System:** 2.8mm AMP MCP
- **Conductor Cross-Sections:** 4 mm²
- **Tab Size:** 0.8 x 2.8 mm
- **Voltage Range:** up to 850V DC (depends on the mating plug)
- **Operation Temperature:** -40 °C up to 140 °C
- **Current Carrying Capacity:** 40A at 85 °C
- **IP rating:** Plugged: IP67, IP6k9k, Unplugged: IP2XB
- **HVIL:** Integrated, internal
- **Fire Classification:** HB
- **Vibration Level:** V1
- **Product Specification:** tbd
- **Application Specification:** 408-10441
- **Available Keys:** A, B, D, E, F

* Drawing Number is NOT the Order Number!
AMP+ HVA 280 Shipping Caps

Drawing 1587733 *

Shipping caps fit TE standard headers

* Drawing Number is NOT the Order Number!
AMP+ HVA 630
2-Position

INTRODUCTION

The AMP+ HVA 630 product family is touch-safe and provides CPA (Connector Position Assurance), as well as HVIL (High Voltage Interlock) functionality.

High-voltage applications like onboard chargers (OBC) typically required sealed and shielded two-position DC connectors and headers. Therefore, TE Connectivity has developed the AMP+ HVA 630 product family. The standard contact system AMP MCP 6.3 / 4.8 is a well-proven contact system in the industry. The shielded multicore wire is designed for conductor cross-section from 2.5 up to 6.0 mm$^2$. This allows currents of 40 A at 140° C ambient temperature and voltages of up to 850 V DC.

Naming Convention
HVA630 Connector Family

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<th>Description</th>
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<tr>
<td>x = N/A</td>
<td></td>
</tr>
<tr>
<td>HVA</td>
<td>hv = Present</td>
</tr>
<tr>
<td></td>
<td>x = Not Present or N/A</td>
</tr>
<tr>
<td>Number of Positions</td>
<td>2p or 5p</td>
</tr>
</tbody>
</table>

H V A 630 – 2p h m X EVR
**Technical Features**

**Pin Number:**
2 (+2 HVIL)

**Contact System:**
AMP MCP 6.3 / 4.8 contact system

**Conductor Cross-sections:**
2.5 mm² - 6.0 mm²
from LV216-2

**Voltage Range:**
850 V DC

**Operation Temperature:**
-40 °C up to 140 °C

**Current Carrying Capacity:**
40A @ 140 °C ambient temperature

**IP Rating:**
Plugged: IP6k7, IP6k9k
Unplugged: IP2XB

**HVIL:**
Bridged in the connector

**CPA:**
Yes

**Product Specification:**
108-94264

**Application Specification:**
114-94100

---

**AMP+ HVA 630 2phm - Plug**

- **Version (Cable Dimension)**
  - 2.0 x 4.0 mm² released
  - 2.0 x 6.0 mm² released

- **Coding**
  - A
  - F

- **With CPA**
  - ✓
  - ✓

- **Order Information**
  - To be Ordered see drawing!

---

**Intelligent Plug**

- **Order Information**
  - To be Ordered see drawing!

The HVA 630 Intelligent Plug is an high voltage connector, which acts as an blind plug. The Intelligent Plug includes no power contacts. Its function is limited to act as shunt of the HVIL contacts, to shield and seal the system.

---

* Drawing Number is NOT the Order Number!
**Technical Features**

**Pin Number:**
2 (+2 HVIL)

**Contact System:**
AMP MCP 6.3 / 4.8 contact system

**Conductor Cross-sections:**
2.5 mm² - 6.0 mm²
from LV216-2

**Voltage Range:**
850 V DC

**Operation Temperature:**
-40 °C up to 140 °C

**Current Carrying Capacity:**
40A @ 140 °C ambient temperature

**IP Rating:**
Plugged: IP6k7, IP6k9k
Unplugged: IP2XB

**HVIL:**
Bridged in the connector

**CPA:**
Yes

**Interface Drawing:**
114-94036

**Interface Drawing Adapter Plate:**
114-94037

**Product Specification:**
108-94264

**Application Specification:**
114-94100

---

**AMP+ HVA630 2phi - Header**

<table>
<thead>
<tr>
<th>Coding</th>
<th>Order Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>To be Ordered see drawing!</td>
</tr>
</tbody>
</table>

* Drawing Number is NOT the Order Number!
The AMP+ HVA 630 5-position connector allows for a three-phase charging current of 32 A and meets the relevant IEC62196-2 type 2 standard for a maximum charging capacity of 22 kW.

The increasing battery capacity of plug-in hybrid and electric vehicles requires a higher amount of charging power to make charging times of less than four hours possible.

The connector provides finger protection and is designed for multi-shielded 360°, includes High Voltage Interlock functionality and is based on synthetic material with V0 inflammability Classification.

Due to its lever control, the necessary mating forces is less than 70 N.
AMP+ HVA 630 5phm - Plug

Technical Features

- **Pin Number:** 5 (+2 HVIL)
- **Contact System:** AMP MCP 6.3 / 4.8 contact system
- **Conductor Cross-sections:** 4.0 mm² and 6.0 mm², according to LV216-2
- **Voltage Range:** 750 V DC
- **Operation Temperature:** -40 °C up to 140 °C
- **Current Carrying Capacity:** 32 A @ 140 °C ambient temperature
- **IP Rating:**
  - Plugged: IP6k7, IP6k9k
  - Unplugged: IP2Xb
- **HVIL:** Bridged in the connector
- **CPA:** Yes
- **Fire Classification:** VO
- **Vibration Level:** VL2
- **Product Specification:** 108-94235
- **Application Specification:** 114-94114

---

### AMP+ HVA630 5phm - Plug - Version (Cable Dimension) Coding With CPA Without CPA Order Information

<table>
<thead>
<tr>
<th>Version (Cable Dimension)</th>
<th>Coding</th>
<th>With CPA</th>
<th>Without CPA</th>
<th>Order Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.0 x 6.0 mm² released</td>
<td>A</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>4.0 x 4.0 mm² released</td>
<td>A</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>3.0 x 4.0 mm² released</td>
<td>A</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>3.0 x 6.0 mm²</td>
<td>A</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>4.0 x 6.0 mm²</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Drawing Number is NOT the Order Number!

---

* Drawing 114-94114-1 *
AMP+ HVA 630 5phx - Header, 180° Tabs

Technical Features

Pin Number:
5 (+2 HVIL)

Contact System:
AMP MCP 6.3 / 4.8 contact system

Conductor Cross-sections:
4.0 mm² and 6.0 mm²,
according to LV216-2

Voltage Range:
750 V DC

Operation Temperature:
-40 °C up to 140 °C

Current Carrying Capacity:
32 A @ 140 °C
ambient temperature

IP Rating:
Plugged: IP6k7, IP6k9k
Unplugged: IP2XB

HVIL:
Bridged in the connector

CPA:
Yes

Fire Classification:
VO

Vibration Level:
VL2

Interface Drawing:
114-94099

Interface Drawing Adapter Plate:
114-94279

Product Specification:
108-94235

Application Specification:
114-94114

---

AMP+ HVA630 5phx - Header, 180° Tabs

<table>
<thead>
<tr>
<th>Coding</th>
<th>Order Information</th>
</tr>
</thead>
</table>
| HVA 630 - 5p - Header | A | To be Ordered

* Drawing Number is NOT the Order Number!
**Technical Features**

- **Pin Number:**
  5 (+2 HVIL)

- **Contact System:**
  AMP MCP 6.3 / 4.8 contact system

- **Conductor Cross-sections:**
  4.0 mm² and 6.0 mm², according to LV216-2

- **Voltage Range:**
  750 V DC

- **Operation Temperature:**
  -40 °C up to 140 °C

- **Current Carrying Capacity:**
  32 A @ 140 °C ambient temperature

- **IP Rating:**
  Plugged: IP6k7, IP6k9k
  Unplugged: IP2XB

- **HVIL:**
  Bridged in the connector

- **CPA:**
  Yes

- **Fire Classification:**
  VO

- **Vibration Level:**
  VL2

- **Interface Drawing:**
  114-94099

- **Interface Drawing Adapter Plate:**
  114-94279

- **Product Specification:**
  108-94235

- **Application Specification:**
  114-94114

---

**AMP+ HVA 630 5phx - Header, 90° Tabs**

* Drawing 2141619 *

<table>
<thead>
<tr>
<th>Coding</th>
<th>Order Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVA 630 - 5p - Header</td>
<td>A</td>
</tr>
</tbody>
</table>

* Drawing Number is NOT the Order Number!
AMP+ HVP 800

INTRODUCTION

Sealed and shielded pluggable connector for various applications in the e-mobility car infrastructure with up to 200A at 85° (depending on wire cross section). Used e.g. to connect HV battery and inverter or in charging applications.

Naming Convention
HVP 800 Connector Family

H V P 800 - 2p h i X E V R

- **High Voltage**
- **Powertrain**
- **Terminal System or Tab Size Indicator**
- **800 = 8 mm**
- **Round Contact**

Options
- XE = CPA
- VR = Vibration Resistant

 Wire Type
- i = Discrete
- m = Multicore
- x = N/A

 HVIL
- h = Present
- x = Not Present or N/A

 Number of Positions (1p, 2p or 3p)
AMP HVP 800 2phi XE Plug 90°

Technical Features

Terminal Size/Style:
8.0 mm round contact

Contact System:
Plug & Header

Conductor Cross-sections:
25-50 mm²

Voltage Range:
650V / 850V

Operation Temperature:
-40 °C to 140 °C

Current Carrying Capacity:
200 AMP @ 85 °C

IP Rating:
Mated: IP6k9k
Unmated: IpxxB
Mated IPxxD

HVIL:
yes

CPA:
Shunted in plug (design allows for pass-through)

Fire Classification:
HB

Vibration Level:
2 (body mount)

Product Specification:
108-94268

Application Specification:
114-94052

AMP HVP 800 2phi XE Plug 90 deg

<table>
<thead>
<tr>
<th>Version (Cable Dimension)</th>
<th>Coding</th>
<th>With CPA</th>
<th>With Lever</th>
<th>Order Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 / 35 / 50 mm²</td>
<td></td>
<td></td>
<td></td>
<td>released</td>
</tr>
<tr>
<td>(acc. LV216-2)</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>To be Ordered see drawing!</td>
</tr>
<tr>
<td>16 mm²</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>in planning</td>
</tr>
</tbody>
</table>

* Drawing Number is NOT the Order Number!
**AMP HVP 800 3phi XE Plug 90°**

**Technical Features**

**Terminal Size/Style:**
8.0 mm round contact

**Contact System:**
Plug & Header

**Conductor Cross-sections:**
25-50 mm²

**Voltage Range:**
650V / 850V

**Operation Temperature:**
-40 °C to 140 °C

**Current Carrying Capacity:**
200 AMP® 85 °C

**IP Rating:**
Mated: IP6k9k
Unmated: IpxxB
Mated IpxxD

**HVIL:**
yes

**CPA:**
Shunted in plug (design allows for pass-through)

**Fire Classification:**
HB

**Vibration Level:**
2 (body mount)

**Product Specification:**
108-94268

**Application Specification:**
114-94052

---

**AMP HVP 800 3phi XE Plug 90°**

<table>
<thead>
<tr>
<th>Version (Cable Dimension)</th>
<th>Coding</th>
<th>With CPA</th>
<th>With Lever</th>
<th>Order Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 / 35 / 50 mm² (acc. LV216-2) released</td>
<td>A</td>
<td>✓</td>
<td>✓</td>
<td>To be Ordered see drawing!</td>
</tr>
<tr>
<td>B</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 16 mm² in planning |

* Drawing Number is NOT the Order Number!
# AMP HVP 800 2phi XE Plug 180°

**Technical Features**

<table>
<thead>
<tr>
<th>Terminal Size/Style:</th>
<th>8.0 mm round contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact System:</td>
<td>Plug &amp; Header</td>
</tr>
<tr>
<td>Conductor Cross-sections:</td>
<td>25-50 mm²</td>
</tr>
<tr>
<td>Voltage Range:</td>
<td>850V</td>
</tr>
<tr>
<td>Operation Temperature:</td>
<td>-40 °C to 140 °C</td>
</tr>
<tr>
<td>Current Carrying Capacity:</td>
<td>200 AMP @ 85 °C</td>
</tr>
<tr>
<td>IP Rating:</td>
<td>Mated: IP6k9k</td>
</tr>
<tr>
<td></td>
<td>Unmated: IpxxB</td>
</tr>
<tr>
<td></td>
<td>Mated IPxxD</td>
</tr>
<tr>
<td>HVIL:</td>
<td>yes</td>
</tr>
<tr>
<td>CPA:</td>
<td>Shunted in plug (design allows for pass-through)</td>
</tr>
<tr>
<td>Fire Classification:</td>
<td>HB</td>
</tr>
<tr>
<td>Vibration Level:</td>
<td>2 (body mount)</td>
</tr>
<tr>
<td>Product Specification:</td>
<td>108-94297</td>
</tr>
<tr>
<td>Application Specification:</td>
<td>114-94130</td>
</tr>
</tbody>
</table>

### AMP HVP 800 2phi XE Plug 180 deg

**Version**

<table>
<thead>
<tr>
<th>Cable Dimension</th>
<th>Coding</th>
<th>With CPA</th>
<th>With Lever</th>
<th>Order Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 / 35 / 50 mm² (acc. LV216-2) released</td>
<td>A</td>
<td>✓</td>
<td>✓</td>
<td>To be Ordered see drawing!</td>
</tr>
<tr>
<td>B</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 16 mm² | in planning |

* Drawing Number is NOT the Order Number!
**AMP HVP 800 3phi XE Plug 180°**

**Technical Features**

- **Terminal Size/Style:** 8.0 mm round contact
- **Contact System:** Plug & Header
- **Conductor Cross-sections:** 25-50 mm²
- **Voltage Range:** 850V
- **Operation Temperature:** -40 °C to 140 °C
- **Current Carrying Capacity:** 200 AMP @ 85 °C
- **IP Rating:**
  - Mated: IP6k9k
  - Unmated: IpxxB
  - Mated IPxxD
- **HVIL:** yes
- **CPA:**
  - Shunted in plug (design allows for pass-through)
- **Fire Classification:** HB
- **Vibration Level:** 2 (body mount)
- **Product Specification:** 108-94297
- **Application Specification:** 114-94130

**AMP HVP 800 3phi XE Plug 180 deg**

<table>
<thead>
<tr>
<th>Version (Cable Dimension)</th>
<th>Coding</th>
<th>With CPA</th>
<th>With Lever</th>
<th>Order Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 / 35 / 50 mm² (acc. LV216-2) released</td>
<td>A</td>
<td>✓</td>
<td>✓</td>
<td>To be Ordered see drawing!</td>
</tr>
<tr>
<td>16 mm² in planning</td>
<td>B</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

* Drawing Number is NOT the Order Number!
AMP HVP 800 2phi Header

### Technical Features

- **Pin Number:** 2
- **Contact System:** Plug & Header
- **Conductor Cross-sections:** all
- **Voltage Range:** 850V
- **Operation Temperature:** -40 °C to 140 °C
- **Current Carrying Capacity:** 200 AMP @ 85 °C
- **IP Rating:**
  - Mated: IP6k9k
  - Unmated: IP2xB (touch safe)
- **HVIL:** yes
- **CPA:** yes
- **Fire Classification:** HB
- **Vibration Level:** 2
- **Interface Drawing:** 114-94034
- **Interface Drawing Adapter Plate:** 114-94032
- **Product Specification:** 108-94268 / 108-94297
- **Application Specification:** 114-94153

### AMP HVP 800 2phi Header

<table>
<thead>
<tr>
<th>Version (Cable Dimension)</th>
<th>Coding</th>
<th>Order Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>one for all released</td>
<td>B</td>
<td>To be Ordered see drawing!</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D</td>
<td></td>
</tr>
</tbody>
</table>

* Drawing Number is NOT the Order Number!
**AMP HVP 800 3phi Header**

**Technical Features**

- **Pin Number:** 3
- **Contact System:** Plug & Header
- **Conductor Cross-sections:** all
- **Voltage Range:** 850V
- **Operation Temperature:** -40 °C to 140 °C
- **Current Carrying Capacity:** 200 AMP @ 85 °C
- **IP Rating:**
  - Mated: IP6k9k
  - Unmated: IP2xB (touch safe)
- **HVIL:** yes
- **CPA:** yes
- **Fire Classification:** HB
- **Vibration Level:** 2
- **Interface Drawing:** 114-94034
- **Interface Drawing Adapter Plate:** 114-94032
- **Product Specification:** 108-94268 / 108-94297
- **Application Specification:** 114-94153

**AMP HVP 800 3phi Header**

<table>
<thead>
<tr>
<th>Version (Cable Dimension)</th>
<th>Coding</th>
<th>Order Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>one for all released</td>
<td>A</td>
<td>To be Ordered</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>see drawing!</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D</td>
<td></td>
</tr>
</tbody>
</table>

*Drawing Number is NOT the Order Number!
AMP+ HVP 1100

INTRODUCTION

Finger proof, touch safe, one position high current connectors and headers AMP+ 1100 are designed for flexibility with the options needed for various hybrid and electric vehicle device applications.

With a current carrying capability up to 300 A at 85°C, and a cable range between 50 mm² and 950 mm² individually shielded wire, the AMP+ HVP 100 can be used in many high voltage applications. The system provides an integrated internal HVIL for package size optimization.

Naming Convention
HVP 1100 Connector Family

- **HVP 1100**
- **2p h i X EVR**

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>XE = CPA</td>
<td>Terminal System or Tab Size Indicator</td>
</tr>
<tr>
<td>VR = Vibration Resistant</td>
<td>High Voltage</td>
</tr>
<tr>
<td>m = Multicore</td>
<td>Powertrain</td>
</tr>
<tr>
<td>x = N/A</td>
<td>1000 = 11 mm</td>
</tr>
<tr>
<td>h = Present</td>
<td>Bounded Contact</td>
</tr>
<tr>
<td>a = Not Present</td>
<td>Number of Positions (1p, 2p or 3p)</td>
</tr>
</tbody>
</table>

All specifications subject to change. Consult TE Connectivity for latest specifications.
AMP HVP 1100 1phi XE Plug 90 deg

Technical Features

Pin Number:
1 (+2 HVIL)

Contact System:
11 mm Round Contact

Conductor Cross-Sections:
70 mm² according to USCAR-2

Voltage Range:
750 VDC

Operation Temperature:
-40 °C up to 125 °C

Current Carrying Capacity:
300A @ 85 °C (0.9 DeRating)

IP Rating:
Plugged: IP6k7, IP6k9k
Unplugged: IP2XB

HVIL:
Integrated, Internal

CPA:
Yes

Fire Classification:
HB

Vibration Level:
USCAR V1

Product Specification:
108-101203

Application Specification:
114-101010

AMP HVP 1100 1phi XE Plug 90 deg

<table>
<thead>
<tr>
<th>Version (Cable Dimension)</th>
<th>Coding</th>
<th>Order Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>released</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>in planning</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>in planning</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>in planning</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>in planning</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>in planning</td>
<td>F</td>
<td></td>
</tr>
</tbody>
</table>

1*70 mm²

To be Ordered
see drawing!

* Drawing Number is NOT the Order Number!
AMP HVP 1100 1phi XE Header

Technical Features

- Pin Number: 1 (+2 HVIL)
- Contact System: 11 mm round contact
- Conductor Cross-sections: 70 mm² according to USCAR-2 REV.5, USCAR37
- Voltage Range: 750 VDC
- Operation Temperature: -40 °C up to 125 °C
- Current Carrying Capacity: 300A @ 85 °C (0.9 DeRating) ambient temperature
- IP Rating:
  - Plugged: IP6k7, IP6k9k
  - Unplugged: IP2XB
- HVIL: Integrated, Internal
- CPA: Yes
- Fire Classification: HB
- Vibration Level: USCAR V1
- Product Specification: 108-101203
- Application Specification: 114-101010

<table>
<thead>
<tr>
<th>Coding</th>
<th>Order Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>released</td>
<td>A</td>
</tr>
<tr>
<td>in planning</td>
<td>B</td>
</tr>
<tr>
<td>in planning</td>
<td>C</td>
</tr>
<tr>
<td>in planning</td>
<td>D</td>
</tr>
<tr>
<td>in planning</td>
<td>E</td>
</tr>
<tr>
<td>in planning</td>
<td>F</td>
</tr>
</tbody>
</table>

* Drawing Number is NOT the Order Number!
AMP+ IPT

INTRODUCTION

Connector for powertrain applications in high vibration environment, up to 300A (depending on wire cross section) at 105°. Used e.g. to connect inverter to e-machine and charging applications.

Naming Convention
IPT Connector Family

IPT - 2ph i X EVR

Options
XE = CPA
VR = Vibration Resistant

Wire Type
i = Discrete
m = Multicore
x = N/A

HVIL
h = Present
x = Not Present or N/A

Number of Positions
(1p, 2p or 3p)
Technical Features

**Pin Number:**
1

**Contact System:**
IPT screwed

**Conductor Cross-sections:**
16-50 mm²

**Voltage Range:**
800-1000 VDC

**Operation Temperature:**
-40 °C to +140 °C

**Current Carrying Capacity:**
300A @ 105 °C (50 mm²)

**IP Rating:**
IP6k9k

**HVIL:**
no

**CPA:**
no

**Fire Classification:**
HB

**Vibration Level:**
4

**Application Specification:**
114-94133

**Product Specification:**
108-94293

**Interface Drawing:**
114-94132-1

### AMP IPT 1pxi

<table>
<thead>
<tr>
<th>Version (Cable Dimension)</th>
<th>Coding</th>
<th>Order Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>25 / 35 / 50 mm² (acc. LV218-2) released</td>
<td>C</td>
<td>To be Ordered see drawing!</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F</td>
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</tbody>
</table>

16 mm² in planning

* Drawing Number is NOT the Order Number!
Technical Features

**Pin Number:**
2

**Contact System:**
IPT screwed

**Conductor Cross-sections:**
16-50 mm²

**Voltage Range:**
800-1000 VDC

**Operation Temperature:**
-40°C to +140°C

**Current Carrying Capacity:**
300A @ 105°C (50 mm²)

**IP Rating:**
IP6k9k

**HVIL:**
no

**CPA:**
no

**Fire Classification:**
HB

**Vibration Level:**
4

**Application Specification:**
114-94133

**Product Specification:**
108-94293

**Interface Drawing:**
114-94132-2

---

**AMP IPT 2pxi**

<table>
<thead>
<tr>
<th>Version (Cable Dimension)</th>
<th>Coding</th>
<th>Order Information</th>
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<tbody>
<tr>
<td>25 / 35 / 50 mm² released</td>
<td>A</td>
<td>To be Ordered see drawing!</td>
</tr>
<tr>
<td>16 mm² in planning</td>
<td></td>
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</tbody>
</table>

* Drawing Number is NOT the Order Number!
AMP IPT 3pxi

**Technical Features**

**Pin Number:**
3

**Contact System:**
IPT screwed

**Conductor Cross-sections:**
16-50 mm²

**Voltage Range:**
800-1000 VDC

**Operation Temperature:**
-40 °C to +140 °C

**Current Carrying Capacity:**
300A @ 105 °C (50 mm²)

**IP Rating:**
IP6k9k

**HVIL:**
no

**CPA:**
No

**Fire Classification:**
HB

**Vibration Level:**
4

**Application Specification:**
114-94133

**Product Specification:**
108-94293

**Interface Drawing:**
114-94132-3

**Drawing 114-94131-3**

<table>
<thead>
<tr>
<th>Version (Cable Dimension)</th>
<th>Coding</th>
<th>Order Information</th>
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</thead>
<tbody>
<tr>
<td>25 / 35 / 50 mm²</td>
<td>released</td>
<td>A</td>
</tr>
<tr>
<td>16 mm²</td>
<td>in planning</td>
<td></td>
</tr>
</tbody>
</table>

* Drawing Number is NOT the Order Number!
AMP+ Charging Cables

INTRODUCTION

The batteries for plug-in hybrid vehicles can be recharged externally, just like those of electric vehicles. TE Connectivity has developed a charging cable that meets requirements of the international charging standard IEC61851-1/-22. This defines the on-board vehicle type 1 interfaces for the US and Japan, as well as type 2 for Europe. The latter provides for two charging modes: With mode 2 charging can take place wherever there is no special charging infrastructure available – at home, for example. If there is a high-performance charging station available, the mode 3 charging cable can be used.
AMP+ Charging Cable Mode 2 Type 1 US

Technical Features
Conductor Cross-Sections: 0.5 mm² / 2.50 mm²
Voltage Range: 99-121V (single phase)
Operation Temperature: -30 °C and +50 °C
Current Carrying Capacity: 15A
IP Rating: IP55 ICCB
IP44 connectors plugged to inlet
Norms & Standards: IEC 61851-1; SAE J 1772
Versions Domestic Plug: NEMA 5-15
Temperature Sensor Domestic Plug: Yes

AMP+ Charging Cable Mode 2 Type 1 Japan

Technical Features
Conductor Cross-Sections: 0.5 mm² / 2.50 mm²
Voltage Range: 180-220V
Operation Temperature: -30 °C and +50 °C
Current Carrying Capacity: 15A
IP Rating: IP55 ICCB
IP44 connectors plugged to inlet
Norms & Standards: IEC 61851-1; SAE J 1772
Versions Domestic Plug: JIS C 8303 A.16
Temperature Sensor Domestic Plug: Yes
**Technical Features**

**Conductor Cross-sections:**
0.5 mm² / 2.50 mm²

**Voltage Range:**
195-260V (single phase)

**Operation Temperature:**
-30°C and +50°C

**Current Carrying Capacity:**
15A

**IP Rating:**
IP55 ICCB
IP44 connectors plugged to inlet

**Norms & Standards:**
IEC 61851-1

**Versions domestic plug:**
- CEE7/7 90°
- CEE7/7 180°
- CEI 23-16/VII
- BS 1363
- SEV 1011
- AFSNIT 107-2-D1

**Temperature sensor domestic plug:**
Yes
Technical Features

Conductor Cross-sections:
0.5 mm² / 2.50 mm²

Voltage Range:
160-240V (single phase)

Operation Temperature:
-30 °C and +50 °C

Current Carrying Capacity:
Type 2 Mode 3: 20A
Type 3 Mode 3: 16A

IP Rating:
IP44 connectors plugged to inlet or station

Norms & Standards:
IEC 61851-1
INTRODUCTION

To charge their batteries, plug-in-hybrid and electric vehicles share the need to connect to the electrical infrastructure.

TE Connectivity’s AMP+ charging inlets are a modular system, sharing identical parts between the three inlet types. Priority was given to technical compatibility, allowing vehicle makers and system suppliers to fully harmonize functionality across their different Ranges. TE offers a complete product range of compatible charging inlets for worldwide hybrid and electric vehicle applications.
## Technical Features

**Pin Number:**
5 pos

**Contact System:**
roundcontact

**Conductor Cross-Sections:**
0.75-1.00 mm² / 4.00 mm² / 6.00 mm²

**Voltage Range:**
250V

**Operation Temperature:**
-30 °C and +50 °C

**Current Carrying Capacity:**
32A

**IP Rating:**
IP54 (front), IP44 (rear)

**Cable Outlet:**
90° (can be rotated)

**Finger protected:**
Yes

**Vibration Level:**
Level 2

**Application Specification:**
114-94163-1

* Drawing Number is NOT the Order Number!
AMP+ Charging Inlet Type 2

Technical Features

Pin Number:
5-7 pos

Contact System:
roundcontact

Conductor Cross-sections:
0.75-1.00 mm² / 4.00 mm² / 6.00 mm²

Voltage Range:
480V

Operation Temperature:
-30 °C and +50 °C

Current Carrying Capacity:
16/32A

IP Rating:
IP54 (front),
IP44 (rear)

Cable Outlet:
90° (can be rotated)

Finger protected:
yes

Vibration Level:
Level 2

Application Specification:
114-94163-2

* Drawing Number is NOT the Order Number!
AMP+ Charging Inlet Type GB

Technical Features

Pin Number: 5-7 pos
Contact System: roundcontact
Conductor Cross-Sections: 0.75-1.00 mm² / 4.00 mm² / 6.00 mm²
Voltage Range: 440V
Operation Temperature: -30 °C and +50 °C
Current Carrying Capacity: 16/32A
IP Rating: IP54 (front), IP44 (rear)
Cable Outlet: 90° (can be rotated)
Finger protected: yes
Vibration Level: Level 2
Application Specification: 114-94212

* Drawing Number is NOT the Order Number!
Safe, reliable solutions are required to protect service technicians and emergency response teams when working with the high voltages required in electric vehicles.

TE Connectivity’s AMP+ Manual Service Disconnect utilizes a two-stage lever to open the HVIL circuit prior to separation of HV contacts. This tool-free solution for disconnecting the internal HV battery pack and protecting the battery pack HV cables from short circuiting is available in a scalable design with a variety of fuse Ratings. All HV conducting surfaces on receptacle assembly are finger proof touch safe.
AMP+ Manual Service Disconnect – Plug

Technical Features

Fuse Rating:
Up to 630A

Voltage Rating:
450VDC (with fuse)
1000VDC (Shunt)

Operating Temperature:
-40 °C to 65 °C

Storage Temperature:
-40 °C to 85 °C

IP Rating:
Mated: IPx7, IP6k9k
Unmated: IP2xb

HVIL:
2x integrated, internal

Current Rating:
Based on fuse selection

Standards and Specifications:
USCAR-2
USCAR-37
IEC 609529
RoHS

Product Specification:
108-127000

Application Specification:
408-10432

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<th>Fuse Rating</th>
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<td>200A</td>
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</tr>
<tr>
<td>250A</td>
<td></td>
</tr>
<tr>
<td>350A</td>
<td>To be Ordered</td>
</tr>
<tr>
<td>630A</td>
<td>see drawing!</td>
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<tr>
<td>Shunt</td>
<td></td>
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</tbody>
</table>

* Drawing number is NOT the Order number!
**Technical Features**

**Fuse Rating:**
- Up to 630A

**Voltage Rating:**
- 450VDC (with fuse)
- 1000VDC (Shunt)

**Operating Temperature:**
- -40 °C to 65 °C

**Storage Temperature:**
- -40 °C to 85 °C

**IP Rating:**
- Mated: IPx7, IP6k9k
- Unmated: IP2xb

**HVIL:**
- 2x integrated, internal

**Current Rating:**
- Based on fuse selection

**Standards and Specifications:**
- USCAR-2
- USCAR-37
- IEC 60529
- RoHS

**Product Specifications:**
- 108-127000

**Application Specifications:**
- 408-10377

---

### AMP+ Manual Service Disconnect – Receptacle

Drawing 1587987 *

* Drawing number is NOT the Order number!

<table>
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<tr>
<th>Order Information</th>
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<tr>
<td>Receptacle</td>
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<tr>
<td>Housing</td>
</tr>
<tr>
<td>To be Ordered</td>
</tr>
<tr>
<td>see drawing!</td>
</tr>
</tbody>
</table>
Relays & Contactors

INTRODUCTION

Better. Smaller. Safer. TE’s high-voltage contactors and relays enable safe disconnection and connection of the traction battery. Suited for use in hybrid, full electric, fuel cell vehicles and vehicle charging systems, they use proven technology in an innovative manner.

Our high-voltage product portfolio includes the EVC 175, EVC 250 and EVC 250-800 main contactors. Each high-performing device represents TE’s new generation of high-voltage contactors. TE’s long-proven EVC 135 and EVC 500 contactors also provide fast and reliable current switching. Completing the range, our Mini K HV pre-charge relays are a cost-effective, safe and light-weight solution for DC high-voltage power systems. All our products fully comply with the demanding switching requirements of hybrid and electric vehicles.
**Mini K HV Precharge Relays**

**Key Features**
- Compact high voltage relay for precharge applications up to 450 VDC
- Precharge current up to 20 A
- Limiting break current up to 20 A
- Small package size, low profile
- Quick connect (QC) terminal assignment similar to ISO 7588-1

**Typical Applications**
- DC high voltage precharge applications in hybrid, full battery electric vehicles and fuel cell cars

**Contact Data**
- Contact arrangement:
  1 Form X (NO DM)
- Rated voltage: 400 VDC
- Limiting cont. current at 85 °C: n/a ¹
- Limiting making / breaking current: 20 A >10³ ops. / 20 A >10 ops. ²
- Operate / release time max. (typ.): 2.5 ms / 1 ms

**Coil Data**
- Rated coil voltage / power:
  12 VDC ¹
- Rated coil power (+23°C):
  PCB: 2.9 W / Plug-in: 3.5 W ¹
- Coil resistance (+23°C):
  PCB: 50 Ω / Plug-in: 41.6 Ω

**Ordering Information Mini K HV precharge Relays**

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Arrangement</th>
<th>Coil</th>
<th>Terminal / Mounting</th>
<th>Coil Suppression</th>
<th>Rated Voltage</th>
<th>Resistance</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>V23700-C0001-A408</td>
<td>1 form X (NO DM)</td>
<td>12 VDC</td>
<td>PCB, sealed</td>
<td>without parallel resistor</td>
<td>400 VDC</td>
<td>50 Ω</td>
<td>2-1904058-5</td>
</tr>
<tr>
<td>V23700-F0002-A408</td>
<td>1 form X (NO DM)</td>
<td>12 VDC</td>
<td>Plug-in, QC</td>
<td>with parallel resistor</td>
<td>400 VDC</td>
<td>41.6 Ω</td>
<td>2-1904058-7</td>
</tr>
</tbody>
</table>

¹ Max. continuous current is limited and depends on operating conditions. Consult TE Connectivity for details.
² Min. 10 fault break operations.
**EVC 135 Contactor**

### Key Features
- Continuous current up to 135 A
- Load voltage up to 450 VDC
- Short circuit carry capability 2,000 A
- Available in side mount or bottom mount configuration
- Customized connections available

### Typical Applications
- Main contactor, precharge and auxiliary relay for hybrid and electric vehicles

### Contact Data
- **Contact arrangement:** 1 Form X (NO DM)
- **Rated voltage:** 450 VDC
- **Limiting cont. current at 85 °C:** 250 A
- **Limiting making / breaking current:** 50 A / 50 A (>50,000 ops.)
- **Short term current rating:** (1 min) 400 A
- **Short circuit carry current:** 2,000 A
- **Operate / release time max. (typ.):** 25 ms / 10 ms

### Coil Data
- **Rated coil voltage / power:** 12 VDC, 24 VDC
- **Rated coil power (+23°C):** 5.5 W (standard version), 9.5 W (low pull-in version)
- **Coil resistance (+20°C):** 26 Ω, 15.3 Ω, 3.8 Ω available for different pull-in voltages

### Ordering Information EVC 135 Contactor

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Arrangement</th>
<th>Coil (VDC)</th>
<th>Econo-</th>
<th>Coil Suppr.</th>
<th>Rated Voltage (VDC)</th>
<th>Terminal Type</th>
<th>Mounting</th>
<th>Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVC 135-4BNGA</td>
<td>1 form X (NO DM)</td>
<td>12 Required</td>
<td>On request</td>
<td>450 Stripped wires / Screws</td>
<td>Bottom</td>
<td>15.3 Ω</td>
<td>2219560-2</td>
<td></td>
</tr>
<tr>
<td>EVC 135-5ANGA</td>
<td>1 form X (NO DM)</td>
<td>12 Optional</td>
<td>On request</td>
<td>450 Stripped wires / Screws</td>
<td>Bottom</td>
<td>26 Ω</td>
<td>2219560-7</td>
<td></td>
</tr>
<tr>
<td>EVC 135-7BNGA</td>
<td>1 form X (NO DM)</td>
<td>24 Optional</td>
<td>On request</td>
<td>450 Stripped wires / Screws</td>
<td>Bottom</td>
<td>96 Ω</td>
<td>2219560-4</td>
<td></td>
</tr>
<tr>
<td>EVC 135-4BNHA</td>
<td>1 form X (NO DM)</td>
<td>12 Required</td>
<td>On request</td>
<td>450 Stripped wires / Screws</td>
<td>Side</td>
<td>15.3 Ω</td>
<td>2138602-1</td>
<td></td>
</tr>
<tr>
<td>EVC 135-5BNGA</td>
<td>1 form X (NO DM)</td>
<td>12 Optional</td>
<td>On request</td>
<td>450 Stripped wires / Screws</td>
<td>Bottom</td>
<td>26 Ω</td>
<td>2219560-3</td>
<td></td>
</tr>
<tr>
<td>EVC 135-6BNGA</td>
<td>1 form X (NO DM)</td>
<td>12 Required</td>
<td>On request</td>
<td>450 Stripped wires / Screws</td>
<td>Bottom</td>
<td>3.8 Ω</td>
<td>2219560-1</td>
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</tr>
</tbody>
</table>

1) Consult TE Connectivity for higher voltages. For details please refer to datasheet.
EVC 175 Main Contactor

Key Features
- Continuous current up to 175 A
- Suitable for voltage levels up to 500 VDC
- Short circuit carry capability 5,000 A
- Mounting in any direction
- Available with dual and single coil

Typical Applications
- DC high voltage high current applications
- Main contactors for hybrid, full battery electric vehicles and fuel cell cars
- Battery charging systems

Contact Data
- Contact arrangement: 1 Form X (NO DM)
- Rated voltage: 450 VDC
- Limiting cont. current at 85 °C: 175 A
- Limiting making / breaking current: 210 A / 30 A (>100,000 ops.)
- Short term current rating: (0.5 min) 500 A
- Operate / release time max. (typ.): 20 / 8 ms at 12 VDC (coil voltage)

Coil Data
- Rated coil voltage / power: 12 VDC
- Rated coil power (+23 °C): 0.8 W (single coil), 0.49 W (dual coil)
- Coil resistance (+23 °C): 5 Ω (single coil), 3 / 33 Ω (dual coil)

Ordering Information EVC 175 Main Contactor

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Arrangement</th>
<th>Coil (VDC)</th>
<th>Econo- mization</th>
<th>Coil Suppr.</th>
<th>Rated Voltage (VDC)</th>
<th>Terminal Type</th>
<th>Mounting</th>
<th>Resistance</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>V23717-A001-A200</td>
<td>1 form X</td>
<td>12</td>
<td>External</td>
<td>External &gt; 36 V</td>
<td>450</td>
<td>Connector/ Screws</td>
<td>Side</td>
<td>5 Ω</td>
<td>6-1904123-6</td>
</tr>
<tr>
<td>V23717-A002-A200</td>
<td>1 form X</td>
<td>12</td>
<td>Internal</td>
<td>Internal</td>
<td>450</td>
<td>Connector/ Screws</td>
<td>Side</td>
<td>3 / 33 Ω</td>
<td>2-1904070-1</td>
</tr>
</tbody>
</table>

Note:
1) Permitted torque 5 Nm. max. One-time mounting only, no recurring screw fastening permitted.
2) Socket Housing TE Interface 2 pos. MQS Code A, appropriate for socket housing 2 Pos. MQS. TE part number 1-907644-1.
3) Mount load connections first.
4) Valid for 23°C coil temperature with active economization.
5) Protection class applicable for all mounting orientations except load terminals on top.

1) Consult TE Connectivity for higher voltages. For details please refer to datasheet.
2) Valid for 23°C coil temperature with active economization.
3) Protection class applicable for all mounting orientations except load terminals on top.
EVC 250 Main Contactor

Key Features
- Continuous current up to 250 A
- Suitable for voltage levels up to 450 VDC
- Short circuit carry capability 6,000 A
- Mounting in any direction
- Available with dual and single coil

Typical Applications
- DC high voltage high current applications
- Main contactors for hybrid, full battery electric vehicles and fuel cell cars
- Battery charging systems

Contact Data
Contact arrangement: 1 Form X (NO DM)
Rated voltage: 450 VDC
Limiting cont. current at 85 °C: 250 A
Limiting making / breaking current: 250 A / 100 A (>50,000 ops.)
Short term current rating: (1 min) 600 A
Short circuit carry current: (25 ms) 6,000 A
Operate / release time max. (typ.): 25 ms at 14 VDC (coil voltage)

Coil Data
Rated coil voltage / power: 12 VDC
Rated coil power (+23 °C): 1.0 W min. (single coil), 0.44 W (dual coil)
Coil resistance (+23 °C): 4 Ω (single coil), 3 / 36 Ω (dual coil)

Coil Data
Ambient temperature: -40 °C to +85 °C
Category and degree of protection: dustproof, IP 50 (upright); IP54 (others)
Terminal type and mounting: Connector (coil) / M6 bolts (load); screws
Dimensions LxWxH (approx.): 93.1 x 55.3 x 49.8 mm (3.7 x 2.2 x 2.0”)
Weight (approx.): approx. 560 g (19.7 oz)

Ordering Information EVC 250 Main Contactor

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Arrangement</th>
<th>Coil (VDC)</th>
<th>Economization</th>
<th>Coil Suppr.</th>
<th>Rated Voltage (VDC)</th>
<th>Terminal Type</th>
<th>Mounting</th>
<th>Resistance</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>V23720-A0001-A001</td>
<td>1 form X (NO DM)</td>
<td>12</td>
<td>No economizer</td>
<td>External &gt; 36 V</td>
<td>450</td>
<td>Connector / Screws</td>
<td>Side</td>
<td>4 Ω</td>
<td>2-1904070-2</td>
</tr>
<tr>
<td>V23720-A0002-A001</td>
<td>1 form X (NO DM)</td>
<td>12</td>
<td>Coil switch</td>
<td>Internal</td>
<td>450</td>
<td>Connector / Screws</td>
<td>Side</td>
<td>3 / 36 Ω</td>
<td>4-1904065-7</td>
</tr>
</tbody>
</table>

Note:
1) Permitted torque 6 Nm max. One-time mounting only, no recurring screw fastening permitted.
2) Socket Housing
   TE Interface 2 pos. MQS code A, appropriate for socket housing 2 pos. MQS, TE part number 1-967644-1
   Prescribed wire cross section = 0.35mm² min.
3) Mount load connections first.

Tolerances ISO8015 / ISO2768-cL
Consult TE Connectivity for detailed mounting instructions.

1) Consult TE Connectivity for higher voltages. For details please refer to datasheet.
2) Valid for 23°C coil temperature with active economization.
3) Protection class applicable for all mounting orientations except load terminals on top.
Key Features

- Continuous current up to 250 A
- Suitable for voltage levels up to 800 VDC
- High peak current carrying capability up to 6000 A

Typical Applications

- DC high voltage high current applications
- Main contactors for hybrid, full battery electric vehicles and fuel cell cars
- Battery charging systems

Contact Data

Contact arrangement: 1 Form X (NO DM)
Rated voltage: 800 VDC
Limiting cont. current at 85 °C: 250 A
Limiting making / breaking current: 250 A / 50 A (>50,000 ops.)
Short term current rating: (1 min) 600 A
Short circuit carry current: (25 ms) 6,000 A
Operate / release time max. (typ.): 25 ms at 14 VDC (coil voltage)

Coil Data

Rated coil voltage / power: 12 VDC, 24 VDC
Rated coil power (+23 °C): 1.0 W min. (single coil), 0.57 W (12 V dual coil), 0.88W (24 V dual coil)
Coil resistance (+23 °C): 4 Ω (single coil), 3.2 / 29 Ω (12 V dual coil), 5 / 80 Ω (24 V dual coil)

Coil Data

Ambient temperature: -40 °C to +85 °C
Category and degree of protection: dustproof, IP 50 (upright); IP54 ( others)
Terminal type and mounting: Connector (coil) / M6 bolts (load); screws
Dimensions LxWxH (approx.): 93.1 x 55.3 x 49.8 mm (3.7 x 2.2 x 2.0”)
Weight (approx.): approx. 560 g (19.7 oz)

Ordering Information EVC 250-800 Main Contactor

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Arrangement</th>
<th>Coil (VDC)</th>
<th>Econo-</th>
<th>Coil Suppr.</th>
<th>Rated Voltage (VDC)</th>
<th>Terminal Type</th>
<th>Mounting</th>
<th>Resis-</th>
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</thead>
<tbody>
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<td>V23720-</td>
<td>1 form X (NO DM)</td>
<td>12</td>
<td>External</td>
<td>tbd</td>
<td>800</td>
<td>Connector/ Screws</td>
<td>Side</td>
<td>4 Ω</td>
<td>Single coil</td>
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<td>M0101-M001 M0102-M001</td>
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</tr>
<tr>
<td>V23720-</td>
<td>1 form X (NO DM)</td>
<td>12</td>
<td>Dual coil int. switch</td>
<td>tbd</td>
<td>800</td>
<td>Connector/ Screws</td>
<td>Side</td>
<td>3 / 36 Ω</td>
<td>Dual coil</td>
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<tr>
<td>V23720-</td>
<td>1 form X (NO DM)</td>
<td>24</td>
<td>Dual coil int. switch</td>
<td>tbd</td>
<td>800</td>
<td>Connector/ Screws</td>
<td>Side</td>
<td>3 / 36 Ω</td>
<td>Dual coil</td>
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<td>M0112-M001</td>
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</tbody>
</table>

1) Values are influenced by system temperature and load current. Consult TE Connectivity for details.
2) Valid for 23°C coil temperature with active economization.
3) Protection class applicable for all mounting orientations except load terminals on top.
### EVC 500 Main Contactor

#### Key Features
- Continuous current up to 500 A
- Load voltage up to 450 VDC
- Short circuit carry capability 3,500 A
- Optional coil economizer
- Robust bottom mounting with optional economizer enclosure

#### Typical Applications
- Main contactor for hybrid and electric vehicles

#### Contact Data
- Contact arrangement: 1 Form X (NO DM)
- Rated voltage: 450 VDC
- Limiting cont. current at 85 °C: 500 A
- Limiting making / breaking current: 150 A / 150 A (>10,000 ops.)
- Short term current rating: (1 min) 800 A
- Short circuit carry current: 3,500 A
- Operate / release time max. (typ.): 20 ms / 12 ms

#### Coil Data
- Rated coil voltage / power: 12 VDC
- Rated coil power: PWM required
- Coil resistance (+23 °C): 3.14 Ω
- Ambient temperature: -40 °C to +85 °C
- Category and degree of protection: hermetically sealed
- Terminal type and mounting: Stripped wires (coil) / M8 bolts (load); screws

#### Dimensions LxWxH (approx.):
- 80.5 x 58.2 x 72.3 mm (3.2 x 2.3 x 2.9”)

#### Weight (approx.):
- 430 g (15.2 oz)

### Ordering Information EVC 500 Main Contactor

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Arrangement</th>
<th>Coil (VDC)</th>
<th>Economization</th>
<th>Coil Suppr.</th>
<th>Rated Voltage (VDC)</th>
<th>Terminal Type</th>
<th>Mounting</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVC 500- A1ANAM</td>
<td>1 form X (NO DM)</td>
<td>12</td>
<td>No economizer</td>
<td>External &gt; 40 V</td>
<td>450</td>
<td>Stripped wires / Screws</td>
<td>Bottom</td>
<td>2219561-1</td>
</tr>
<tr>
<td>EVC 500- AAANAM</td>
<td>1 form X (NO DM)</td>
<td>12</td>
<td>Internal PWM</td>
<td>Internal</td>
<td>450</td>
<td>Stripped wires / Screws</td>
<td>Bottom</td>
<td>2299223-2</td>
</tr>
</tbody>
</table>

1) Consult TE Connectivity for higher voltages. For details please refer to datasheet.
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