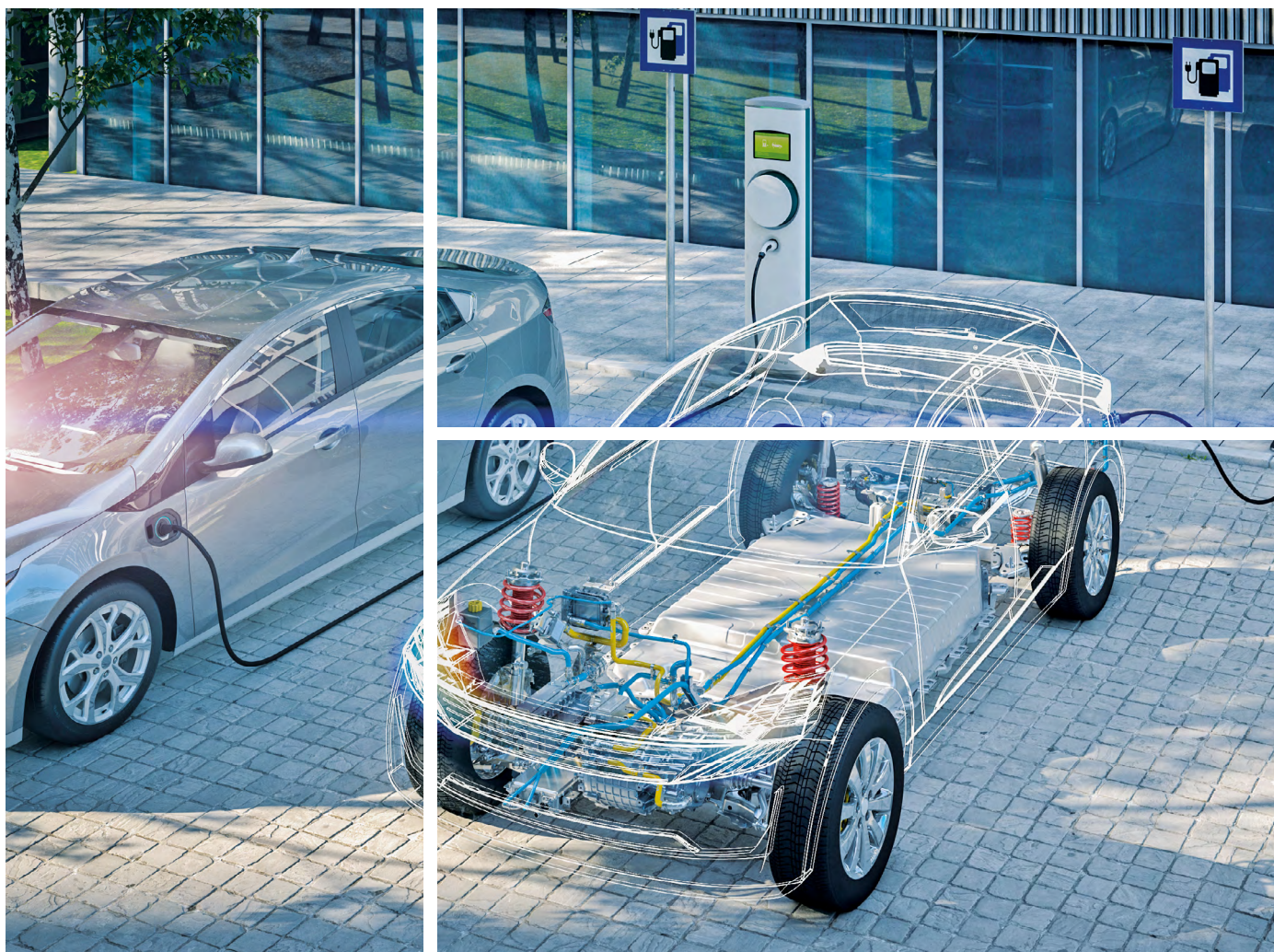


# E-MOBILITY CONNECTIVITY SOLUTIONS

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## Product Catalog



## HIGH-VOLTAGE CONNECTIVITY SOLUTIONS



From the  
Charging  
Point ...



... to the  
Battery ...



... to the  
E-Motor.

TE Connectivity's (TE) portfolio of connectivity solutions for hybrid and electric vehicles cover the entire range of electric powertrains, providing a complete line of connectors, headers, relays, contactors, harnesses and disconnects to safely connect and protect the power flow.

Our hybrid and electric mobility connectivity technologies leverage decades of experience with high-voltage generation, transmission and distribution. These are classified in the following four application areas:



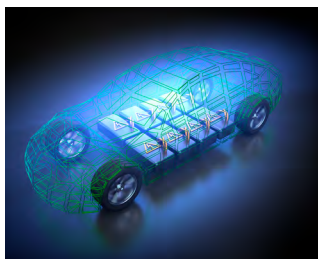
### HV AUXILIARY MODULES

- DC / DC Converter
- On-Board Charger
- HV Heater
- HV Climate Compressor



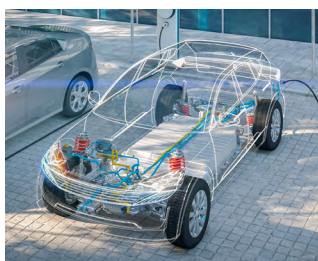
### HV POWERTRAIN

- Inverter
- E-Motor
- HV Battery



### BATTERY CONNECTIVITY

- Battery Modules
- Battery Protection
- Battery Cells



### CHARGING INLET

- AC charging
- Fast charging
  - DC charging
  - Combined Charging System (CCS)



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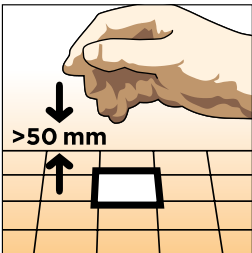
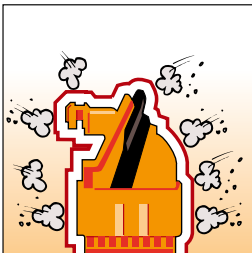
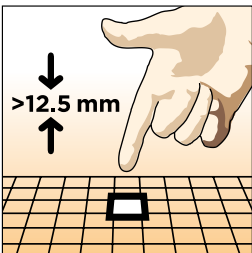
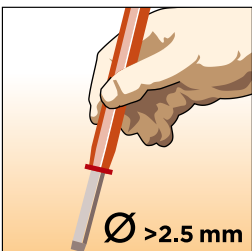
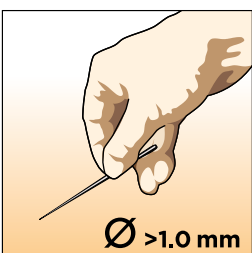


## Temperature &amp; Derating Factor | Current Carrying Capability acc. to EN 60512-5-2

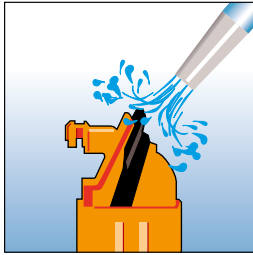
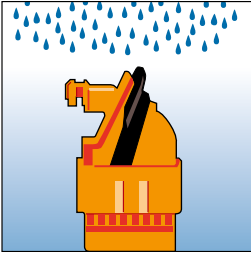
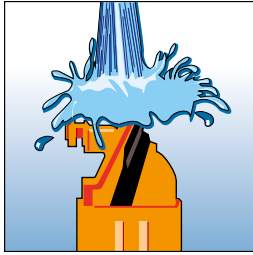
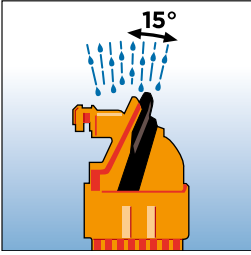
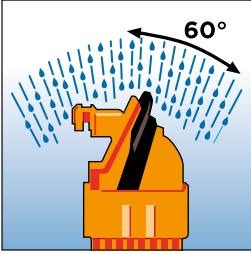
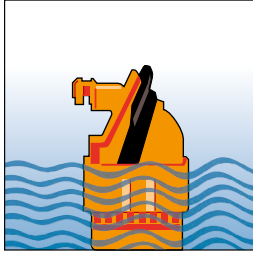
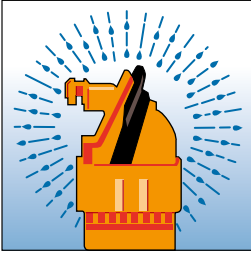
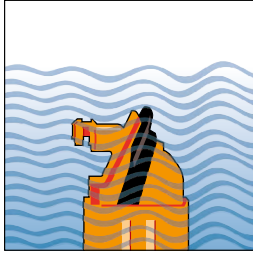
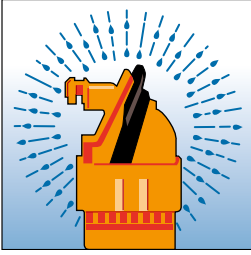
**Current Carrying Capability:**

Except specific comment or nota, current carrying capability value is given at temperature 85°C and considering a derating factor of 20% according to specification DIN EN 60512-5-2.

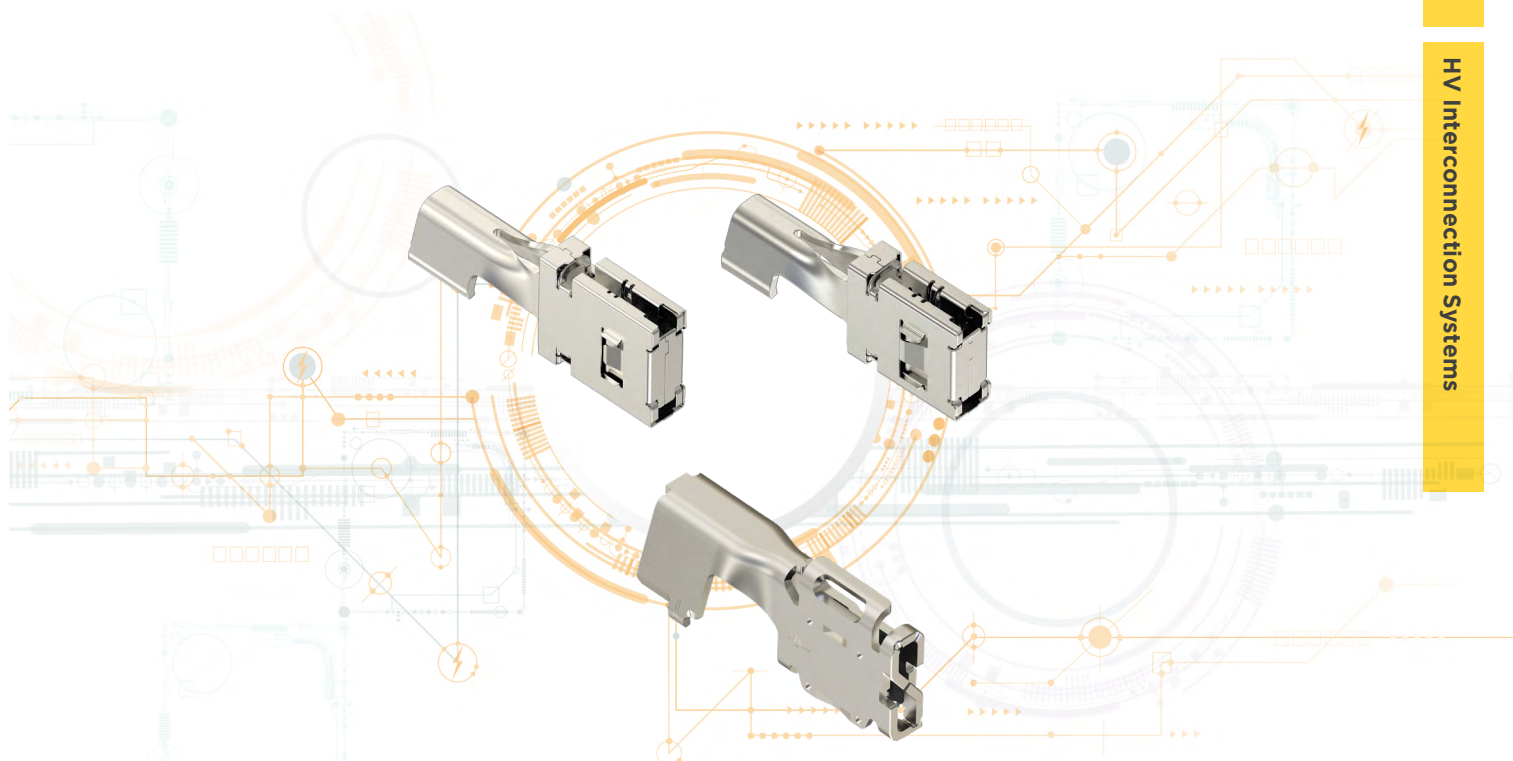
## IP Code | Elements and Significance acc. to IEC 60529 and DIN 40050

| 1st Digit | Against Foreign Objects (incl. Dust)                                                                                                                             | 1st Digit | Against Foreign Objects (incl. Dust)                                                                      |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------|
| 0         |  <p>Not protected.</p>                                                          | 5K        |  <p>Dust protected.</p> |
| 1         |  <p>Protected against solid objects greater than 50 mm (ex. back of hand).</p> | 6K        |  <p>Dust tight.</p>    |
| 2         |  <p>Protected against solid objects greater than 12.5 mm (ex. finger).</p>    |           |                                                                                                           |
| 3         |  <p>Protected against solid objects greater than 2.5 mm (ex. tool).</p>       |           |                                                                                                           |
| 4         |  <p>Protected against solid objects greater than 1.0 mm (ex. wire).</p>       |           |                                                                                                           |

## IP Code | Elements and Significance acc. to IEC 60529 and DIN 40050

| 2nd Digit | Against Water                                                                       |                                                            | 2nd Digit | Against Water                                                                        |                                                                                            |
|-----------|-------------------------------------------------------------------------------------|------------------------------------------------------------|-----------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| 0         |    | Not protected.                                             | 5         |    | Protected against jetting water.                                                           |
| 1         |    | Protected against vertically dripping water.               | 6         |    | Protected against powerfully jetting water.                                                |
| 2         |   | Protected against dripping water when tilted up to 15°.    | 6K        |   | Protected against powerfully jetting water with increased pressure (Automotive).           |
| 3         |  | Protected against spraying water (up to 60° inclination).  | 7         |  | Protected against the temporary effects of immersion up to 1 meter.                        |
| 4         |  | Protected against splashing water.                         | 8         |  | Protected against continuous submersion agreed with customer, but more severe than code 7. |
| 4K        |  | Protected against splashing water with increased pressure. | 9K        |  | Protected against high-pressure/steam-jet cleaning (Automotive).                           |





## PCON HIGH-POWER TERMINALS INTRODUCTION

**PCON high-power terminals are specifically designed to support the increased connectivity requirements in high-voltage interconnection systems of hybrid and all-electric vehicles.**

PCON 12, PCON 18 and PCON 21 terminals, have a common body design optimized for maximum vibration resistance while minimizing mating forces. Each is available with 90° and 180° mating directions and accommodates wire sizes ranging from 5 mm<sup>2</sup> to 95 mm<sup>2</sup> supporting continuous currents up to 400 A.

In addition, the PCON terminals are designed to accept touch-safe protection features integrated into the tab housing according to IEC60529 IP2XB and UL-finger standards for EV powertrain applications therefore enabling safe and easy assembly and maintenance.



### Applications

- On-Board Charger
- Inverter
- HV Battery
- E-motor

### Technical Features

#### Mating Direction:

90° / 180°

#### Wire Range:

5 mm<sup>2</sup> to 16 mm<sup>2</sup>

#### Current Range (at 80°C):

Up to 120 A

#### Contact Normal Force:

Approx. 3.3 N

#### Spring Plating:

Ag / Ni

#### Body Plating:

Ag / Ni

#### Crimping / Welding:

Crimped

#### Terminal Style:

Receptacle

#### Tab Size

(with / without finger protection):

10 x 1.2 mm / 12 x 1.2 mm

#### Voltage Rating:

up to 1,000 VDC

#### Temperature Range:

-40°C to 125°C

#### Vibration Level:

USCAR-1 Class V1

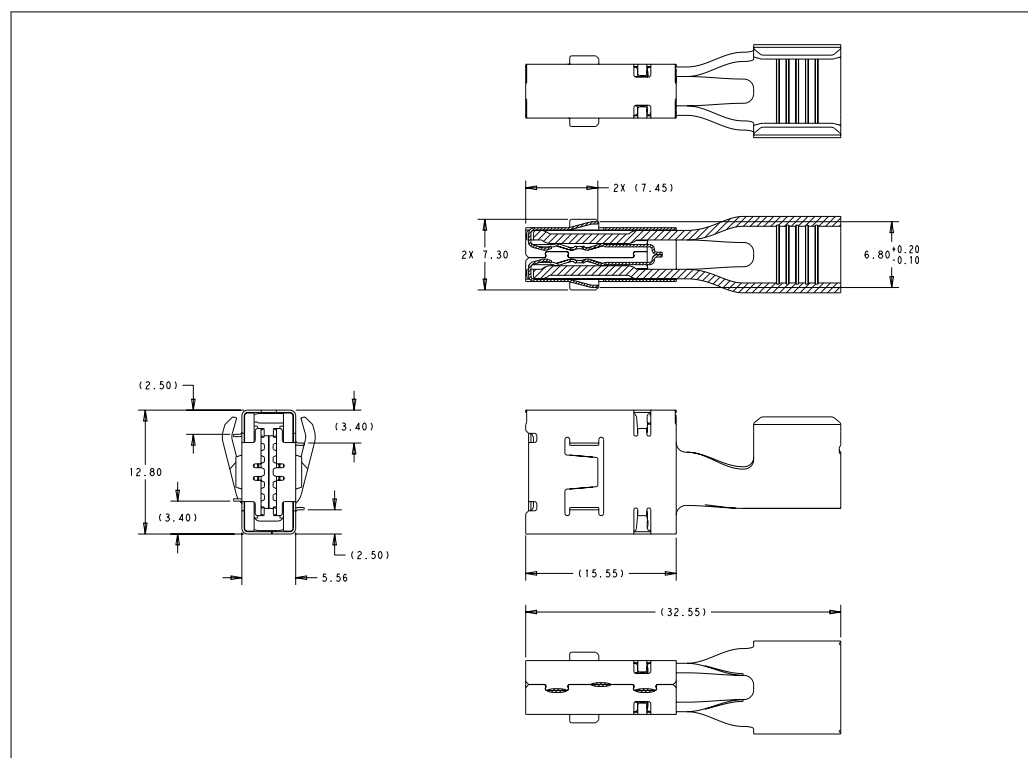
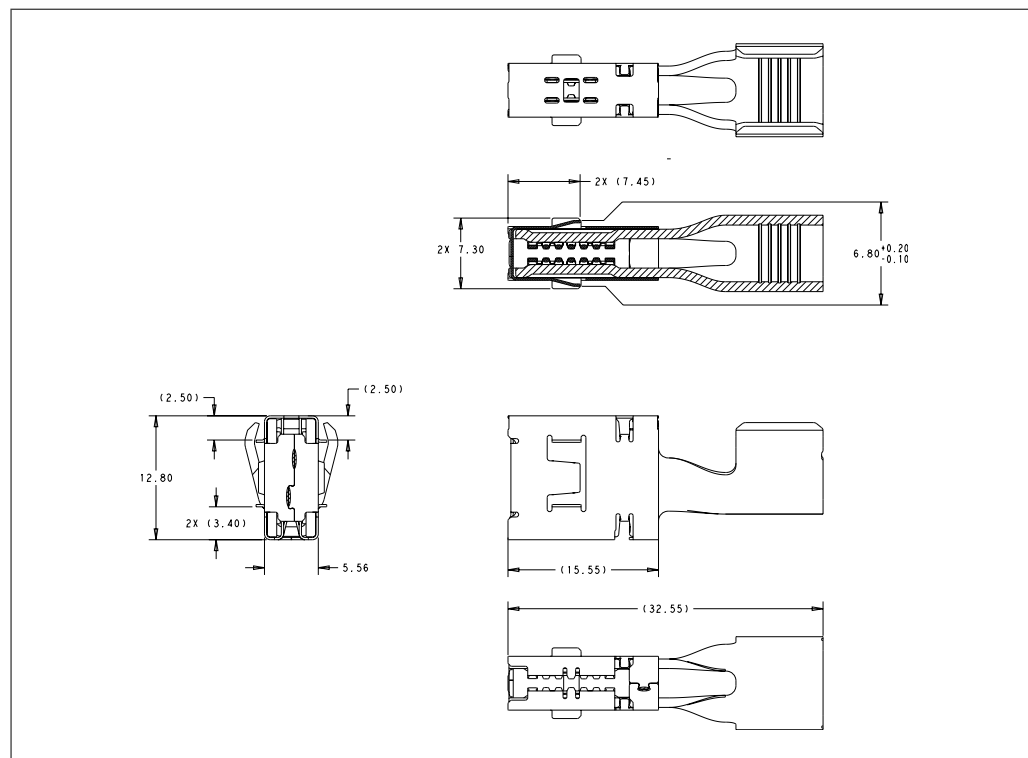
#### Product Specification:

108-32671

#### Application Specification:

114-162014

## PCON 12 Terminals



### Ordering Information PCON 12 Terminals

| Product Name | Product Category | Orientation | Wire Size               | Part Number |
|--------------|------------------|-------------|-------------------------|-------------|
| PCON 12      | Terminals        | 90°         | 5 - 8 mm <sup>2</sup>   | 1-2840573-1 |
|              |                  |             | 10 - 16 mm <sup>2</sup> | 1-2840573-2 |
|              |                  | 180°        | 5 - 8 mm <sup>2</sup>   | 1-2840575-1 |
|              |                  |             | 10 - 16 mm <sup>2</sup> | 1-2840575-2 |



## PCON 18 Terminals



## Applications

- On-Board Charger
- Inverter
- HV Battery
- E-motor

## Technical Features

## Mating Direction:

90° / 180°

## Wire Range:

12 mm<sup>2</sup> to 35 mm<sup>2</sup>

## Current Range (at 80°C):

Up to 180 A at 80°C (35 mm<sup>2</sup>)

## Contact Normal Force:

Approx. 3.3 N

## Spring Plating:

Ag / Ni

## Body Plating:

Ag / Ni

## Termination Type:

Crimped

## Terminal Style:

Receptacle

## Tab Size

(with / without finger protection):

15 x 1.8 mm / 18 x 1.8 mm

## Voltage Rating:

up to 1,000 VDC

## Temperature Range:

-40°C to 125°C

## Vibration Level:

USCAR-1 Class V1

## Product Specification:

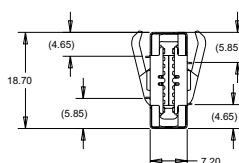
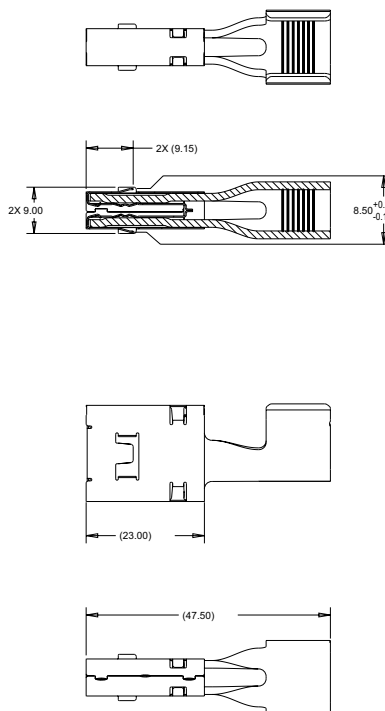
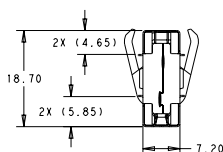
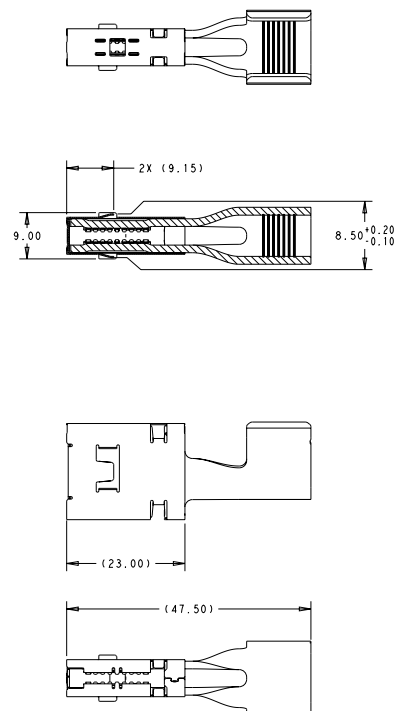
108-32683

## Application Specification:

114-162015

## Ordering Information PCON 18 Terminals

| Product Name | Product Category | Orientation | Wire Size               | Part Number |
|--------------|------------------|-------------|-------------------------|-------------|
| PCON 18      | Terminals        | 90°         | 12 – 20 mm <sup>2</sup> | 1-2840578-1 |
|              |                  |             | 25 – 35 mm <sup>2</sup> | 1-2840578-2 |
|              |                  | 180°        | 12 – 20 mm <sup>2</sup> | 1-2840580-1 |
|              |                  |             | 25 – 35 mm <sup>2</sup> | 1-2840580-2 |





### Applications

- Inverter
- E-motor
- DC fast charging

### Technical Features

#### Mating Direction:

90° / 180°

#### Conductor Cross Sections:

25 mm<sup>2</sup> to 95 mm<sup>2</sup>

#### Current Range (at 80°C):

Up to 400 A at 80°C (95 mm<sup>2</sup>)

#### Contact Normal Force:

Approx. 3.5 N

#### Spring Plating:

Ag / Sn / Ni

#### Body Plating:

Sn / Ni

#### Crimping / Welding:

Crimped

#### Terminal Style:

Receptacle

#### Tab Size

(with / without finger protection):

15.3 x 3 mm / 21 x 3 mm

#### Voltage Rating:

up to 1,000 VDC

#### Temperature Range:

-40°C to 180°C

#### Vibration Level:

SG 2 (LV 215-1)

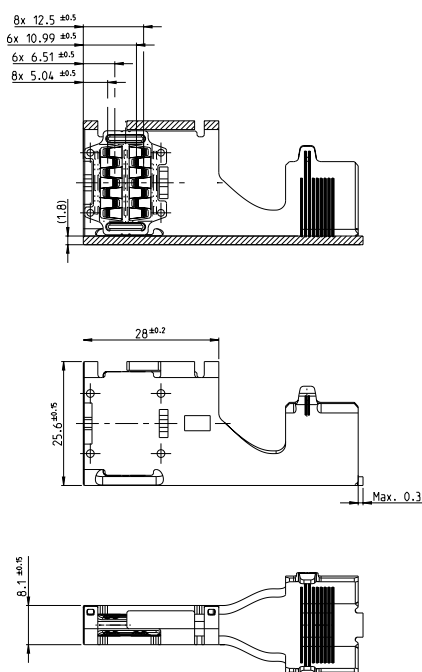
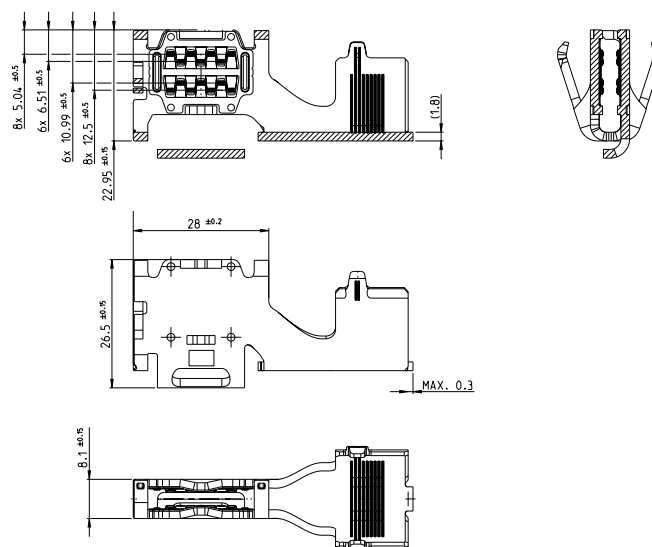
#### Product Specification:

108-94638

#### Application Specification:

114-94511

## PCON 21 Terminals



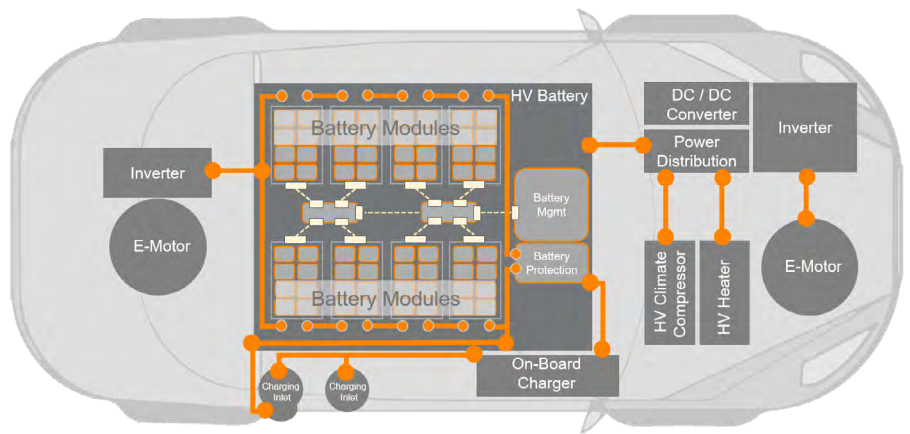
### Ordering Information PCON 21 Terminals

| Product Name | Product Category | Orientation | Wire Size               | Part Number |
|--------------|------------------|-------------|-------------------------|-------------|
| PCON 21      | Terminals        | 90°         | 25 - 50 mm <sup>2</sup> | 2317017-1   |
|              |                  |             | 70 - 95 mm <sup>2</sup> | 2317017-2   |
|              |                  | 180°        | 25 - 50 mm <sup>2</sup> | 2317680-1   |
|              |                  |             | 70 - 95 mm <sup>2</sup> | 2317680-2   |

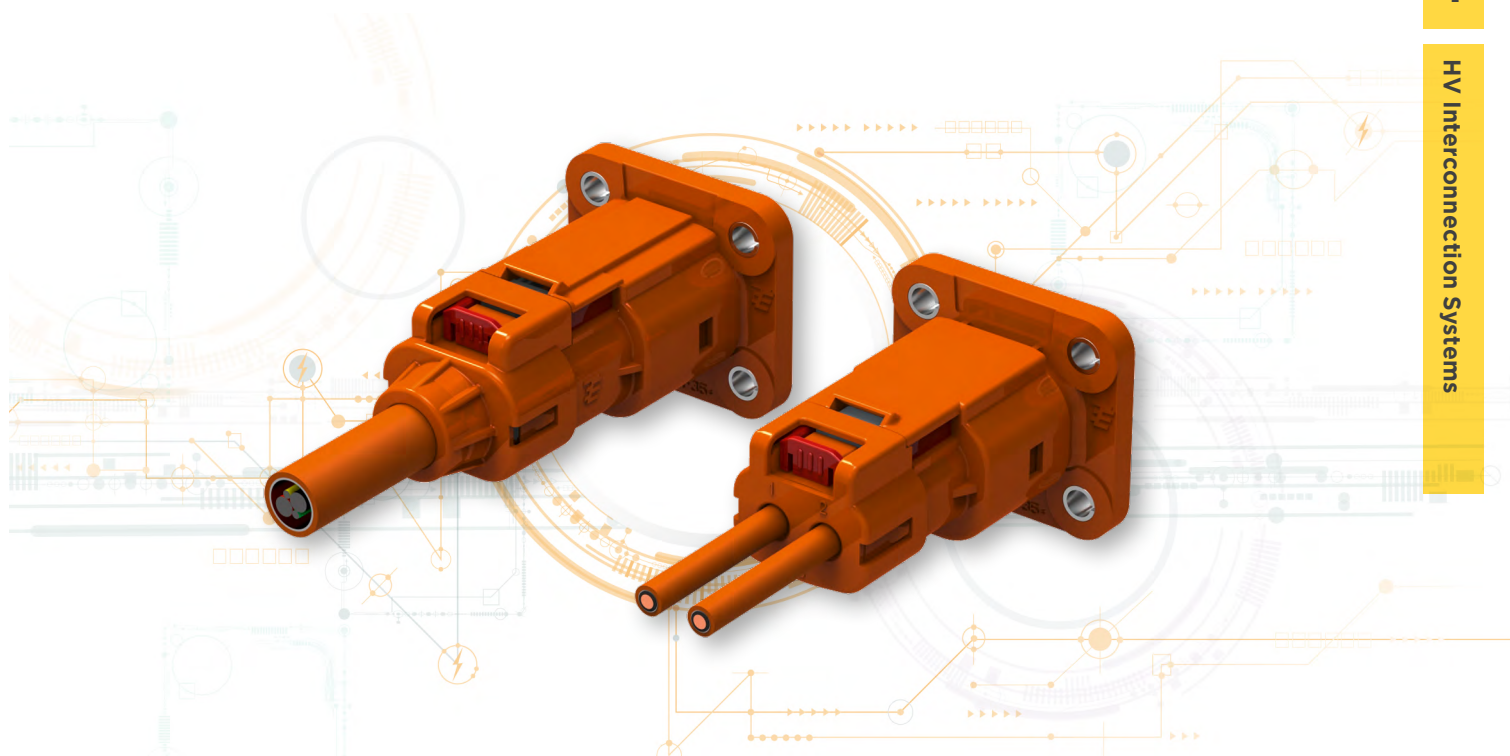


## HV INTERCONNECTION SYSTEMS APPLICATIONS OVERVIEW

TE Connectivity's competitive portfolio covers the entire vehicle electrification spectrum according to LV 215-1 and USCAR standards.



| <b>HV Interconnection Systems<br/>Products &amp; Applications Overview</b> | HV Auxiliary Modules |           |                       |                  | HV Powertrain |         |            |
|----------------------------------------------------------------------------|----------------------|-----------|-----------------------|------------------|---------------|---------|------------|
|                                                                            | DC / DC Converter    | HV Heater | HV Climate Compressor | On-Board Charger | Inverter      | E-Motor | HV Battery |
| AMP+ HVA 280<br>HV Interconnection Systems                                 | ●                    | ●         | ●                     | ●                |               |         |            |
| AMP+ HVU 280<br>HV Interconnection Systems                                 | ●                    | ●         | ●                     | ●                |               |         |            |
| AMP+ HVA 630 2p<br>HV Interconnection Systems                              | ●                    | ●         | ●                     | ●                |               |         |            |
| AMP+ HVU 630 2p<br>HV Interconnection Systems                              | ●                    | ●         | ●                     | ●                |               |         |            |
| AMP+ HVA 630 5p<br>HV Interconnection Systems                              |                      |           |                       | ●                |               |         |            |
| AMP+ HVU 630 5p<br>HV Interconnection Systems                              |                      |           |                       | ●                |               |         |            |
| AMP+ HVA 1200<br>HV Interconnection Systems                                |                      |           |                       | ●                | ●             | ●       | ●          |
| HC-STAK 25<br>HV Interconnection Systems                                   |                      |           |                       |                  | ●             | ●       | ●          |
| AMP+ HVP 800<br>HV Interconnection Systems                                 |                      |           |                       |                  | ●             | ●       | ●          |
| AMP+ HVP 1100<br>HV Interconnection Systems                                |                      |           |                       |                  | ●             | ●       | ●          |
| AMP+ IPT<br>HV Interconnection Systems                                     |                      |           |                       |                  | ●             | ●       | ●          |
| AMP+ HVU 2100<br>HV Interconnection Systems                                |                      |           |                       |                  | ●             | ●       | ●          |



## AMP+ HVA 280 HV INTERCONNECTION SYSTEM INTRODUCTION

The AMP+ HVA 280 low-medium current interconnection system is a two- or three-pole, finger-proof and touch safe connector and header system. Its proven design enhances manufacturability, packaging and offers great flexibility.

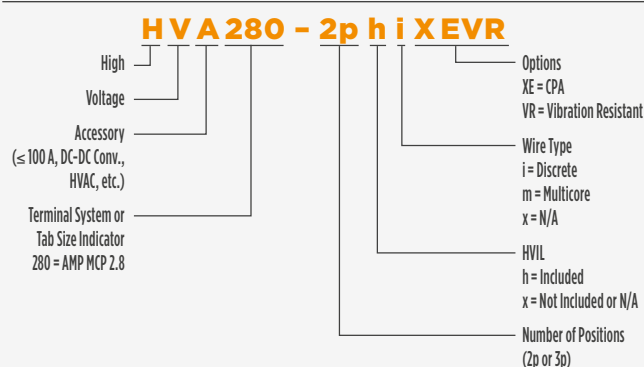
The connector system provides multiple latching options and an integrated internal HVIL, allowing for package size optimization and routing flexibility.

In addition, the HVA 280 product family includes a discrete header design unique to the industry which improves packaging and manufacturing efficiency with a two-stage floating latch for increased system safety.

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

### Naming Convention

#### HVA 280 Interconnection System



## AMP+ HVA 280 HV Interconnection System – Overview Reference Part Numbers

| Plugs        | 2 Positions       |              |                 |              |                |              | 3 Positions          |              | Intelligent Plug |
|--------------|-------------------|--------------|-----------------|--------------|----------------|--------------|----------------------|--------------|------------------|
|              | Individual Cable  |              | Multicore Cable |              |                |              | Multicore Cable only |              |                  |
|              | 2 Stage           | Single Click | 2 Stage         |              | Single Click   |              | 2 Stage              | Single Click |                  |
|              | Shunted HVIL only |              | Pass Thru HVIL  | Shunted HVIL | Pass Thru HVIL | Shunted HVIL | No HVIL              |              |                  |
| Part Numbers | 2103176           | 2103749      | 2103163         | 2103014      | 2103531        | 2103532      | 2103163              | 2103014      | 2103744          |
|              | 2103750           |              |                 |              |                |              |                      |              |                  |

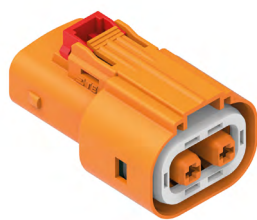
| Headers      | 2 Positions  |          | 3 Positions | 2 Bay Header | 3 Bay Header |
|--------------|--------------|----------|-------------|--------------|--------------|
|              | Single Piece | Discrete | Discrete    | Discrete     | Discrete     |
| Part Numbers | 2103124      | 2103247  | 2103247     | 2103346      | 2103340      |

| Inner Housing for Discrete Headers | 2 Positions | 3 Positions |
|------------------------------------|-------------|-------------|
| Part Numbers                       | 2103245     | 2103321     |
|                                    | 2103722     |             |

| In-Line Cap  | 2 Positions      |                 | 3 Positions     |
|--------------|------------------|-----------------|-----------------|
|              | Individual Cable | Multicore Cable | Multicore Cable |
| Part Numbers | 2103221          | 2103219         | 2103240         |
|              | 2103220          |                 |                 |

\* Drawing number is NOT the order number!





### Applications

- DC / DC Converter
- HV Heater
- HV Climate Compressor
- On-Board Charger

### Technical Features

#### Poles:

2

#### Terminal Size / System:

AMP MCP 2.8

#### Conductor Cross-Sections:

2.5 mm<sup>2</sup> to 4 mm<sup>2</sup>

#### Wire Type:

Single-core

#### Voltage Rating:

1,000 VDC

#### Temperature Range:

-40°C to +125°C

#### Current Carrying Capability:

Derating factor of 10%

40 A at 85°C

#### IP Rating, Mated:

IP67, IP6K9K

#### IP Rating, Unmated:

IP2XB

#### HV Interlock Option:

Shunted

(shorting-bar in the connector)

#### CPA:

Yes

#### Fire Classification:

HB

#### Vibration Level:

USCAR-2 Class V1

#### Shielding / Options:

Yes

#### EMC Shielding Resistance:

10 mΩ

#### Available Codings:

A, B, D, E, F, G

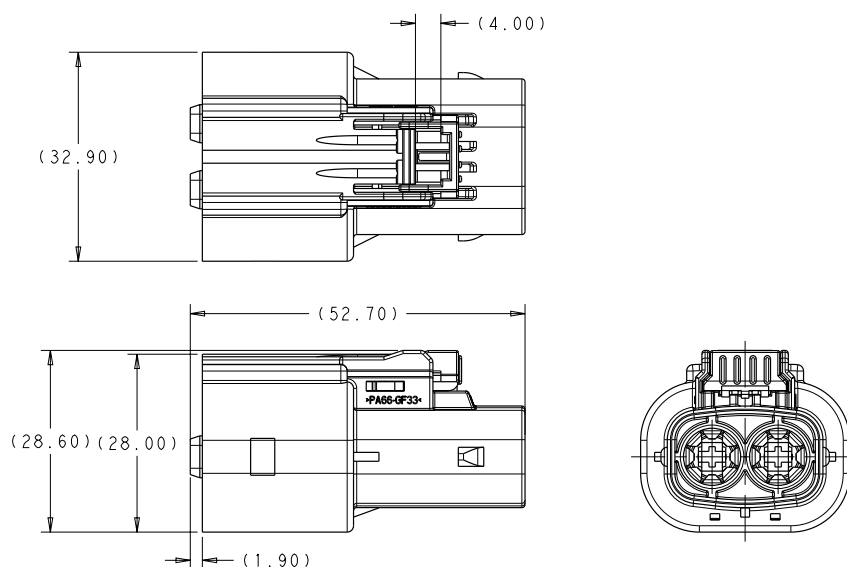
#### Product Specification:

108-2394

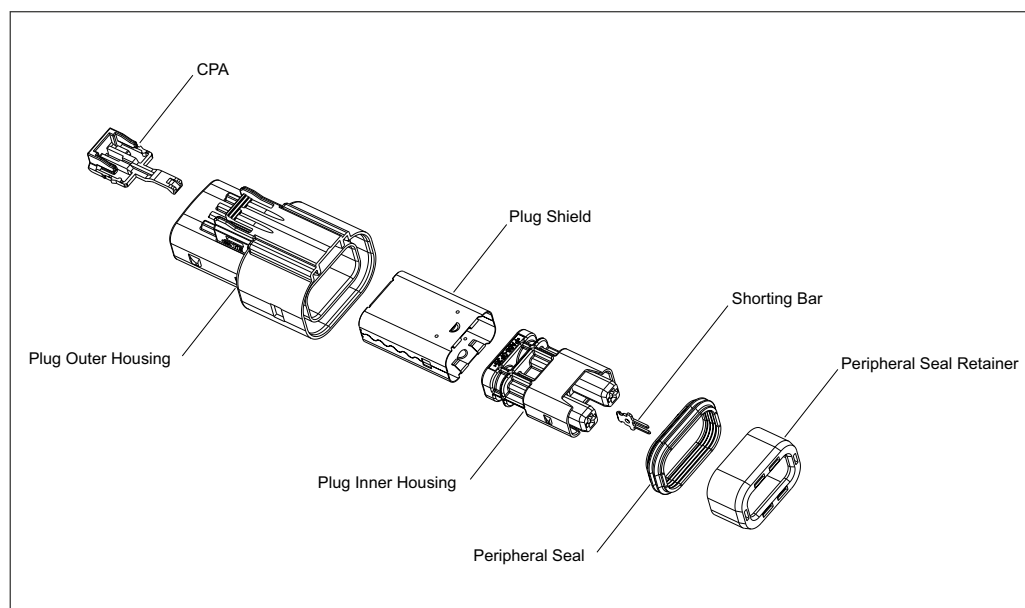
#### Application Specification:

114-32156

## AMP+ HVA 280 SE - Plug



Drawing 2103628 \*



\* Drawing number is NOT the order number!



### Applications

- DC / DC Converter
- HV Heater
- HV Climate Compressor
- On-Board Charger

### Technical Features

#### Poles:

2

#### Terminal Size / System:

AMP MCP 2.8

#### Conductor Cross-Sections:

2.5 mm<sup>2</sup> to 4 mm<sup>2</sup>

#### Wire Type:

Single-core

#### Voltage Rating:

600 VDC

#### Temperature Range:

-40°C up to 125°C

#### Current Carrying Capability:

Derating factor of 10%

40 A at 85°C

#### IP Rating, Mated:

IP67, IP6K9K

#### IP Rating, Unmated:

IP2XB

#### HV Interlock Option:

Integrated, internal

#### Latch Access Type:

Finger and tool accessible

#### CPA:

Optional

#### Fire Classification:

HB

#### Vibration Level:

USCAR-2 Class V1

#### Shielding / Options:

Yes

#### EMC Shielding Resistance:

10 mΩ

#### Available Codings:

A, B, D, E, F, G

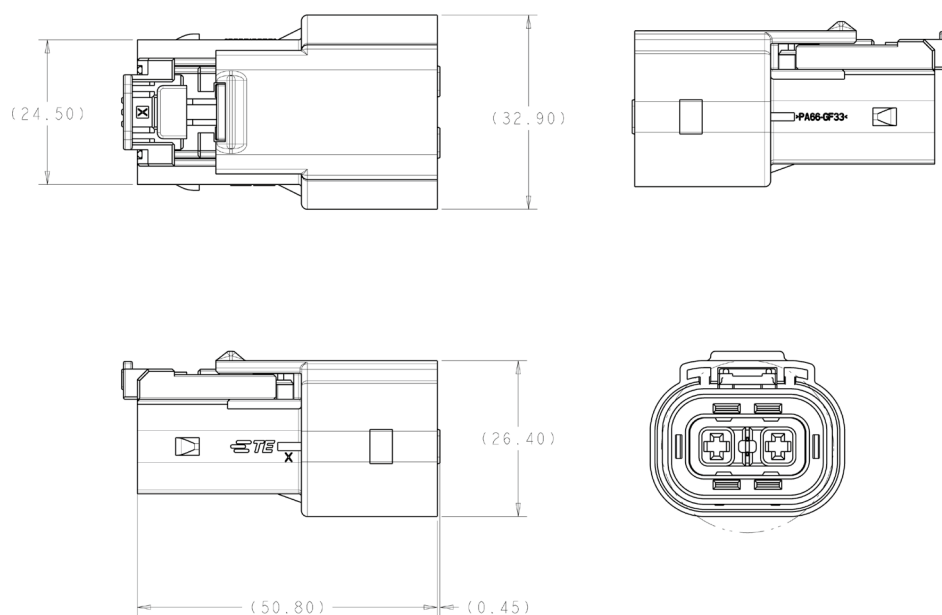
#### Product Specification:

108-2394

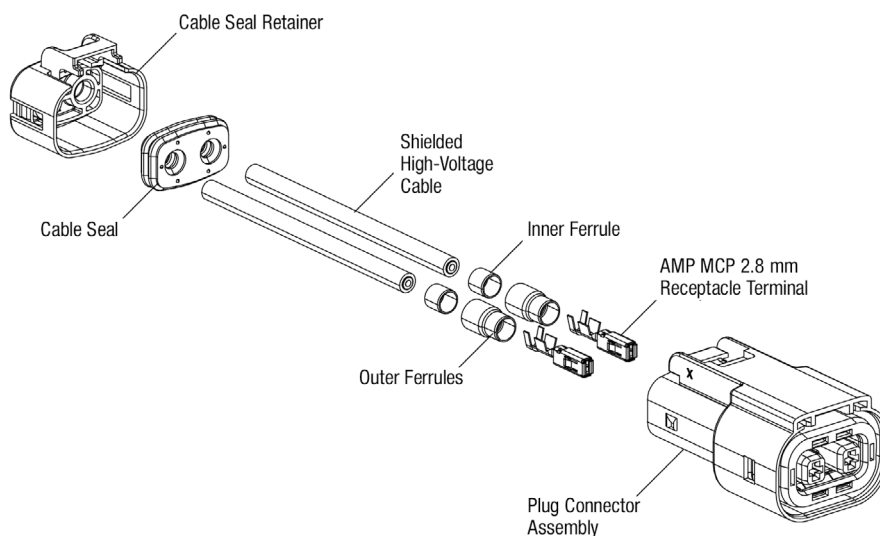
#### Application Specification:

114-13259

## AMP+ HVA 280 2p hi XE - Plug



Drawing 2103176 \*



\* Drawing number is NOT the order number!



### Applications

- DC / DC Converter
- HV Heater
- HV Climate Compressor
- On-Board Charger

### Technical Features

#### Poles:

2

#### Terminal Size / System:

AMP MCP 2.8

#### Conductor Cross-Sections:

2.5 mm<sup>2</sup> to 4 mm<sup>2</sup>

#### Wire Type:

Multi-core

#### Voltage Rating:

850 VDC

#### Temperature Range:

-40°C up to 140°C

#### Current Carrying Capability:

33 A at 85°C

#### IP Rating, Mated:

IP67, IP6K9K

#### IP Rating, Unmated:

IP2XB

#### HV Interlock Option:

Integrated, internal

#### Latch Access Type:

Finger and tool accessible

#### CPA:

Yes

#### Fire Classification:

HB

#### Vibration Level:

SG 2 (LV 215-1)

#### Shielding / Options:

Yes

#### EMC Shielding Resistance:

10 mΩ

#### Available Codings:

A, B, D, E, F

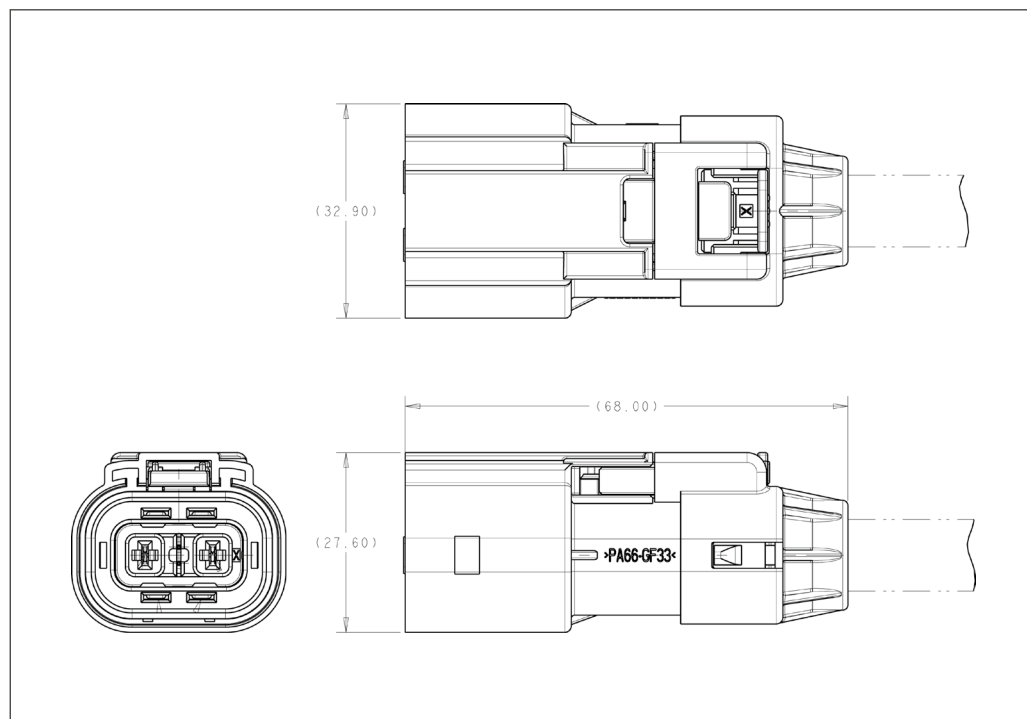
#### Product Specification:

108-32020

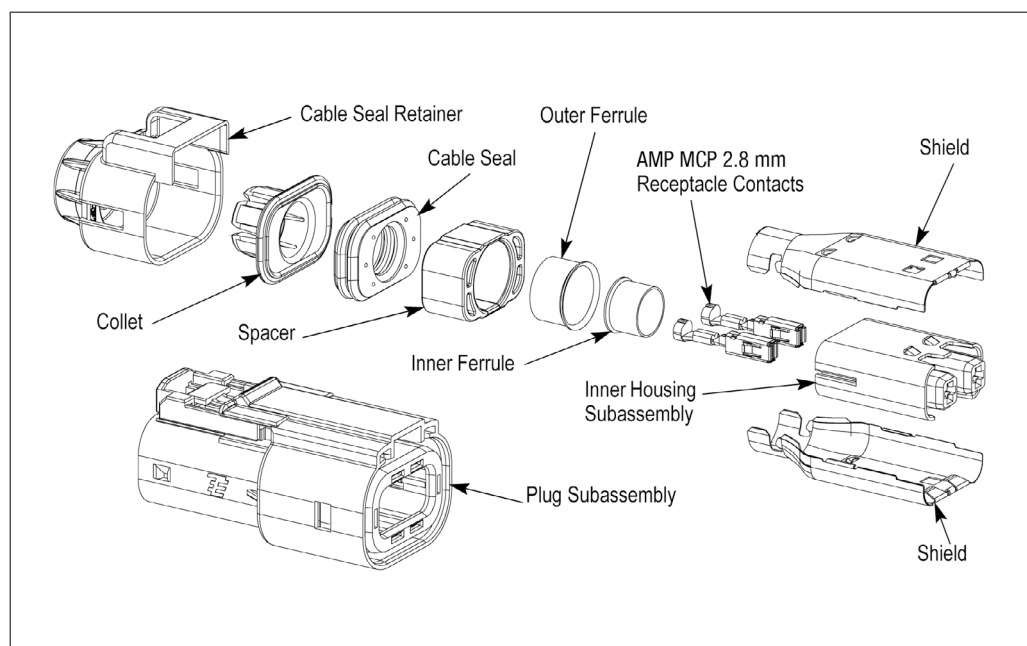
#### Application Specification:

114-13305

## AMP+ HVA 280 2p hm – Shunted HVIL Plug



2103014 \*(Shunted) and 2103437 \*(Pass through)



\* Drawing number is NOT the order number!



### Applications

- DC / DC Converter
- HV Heater
- HV Climate Compressor
- On-Board Charger

### Technical Features

#### Poles:

2

#### Terminal Size / System:

AMP MCP 2.8

#### Conductor Cross-Sections:

2.5 mm<sup>2</sup> to 4 mm<sup>2</sup>

#### Wire Type:

Multi-core

#### Voltage Rating:

850 VDC

#### Temperature Range:

-40°C up to 140°C

#### Current Carrying Capability:

33 A at 85°C

#### IP Rating, Mated:

IP67, IP6K9K

#### IP Rating, Unmated:

IP2XB

#### HV Interlock Option:

Integrated, internal

#### Latch Access Type:

Finger and tool accessible

#### CPA:

Yes

#### Fire Classification:

HB

#### Vibration Level:

SG 2 (LV 215-1)

#### Shielding / Options:

Yes

#### EMC Shielding Resistance:

10 mΩ

#### Available Codings:

A, B, D, E, F

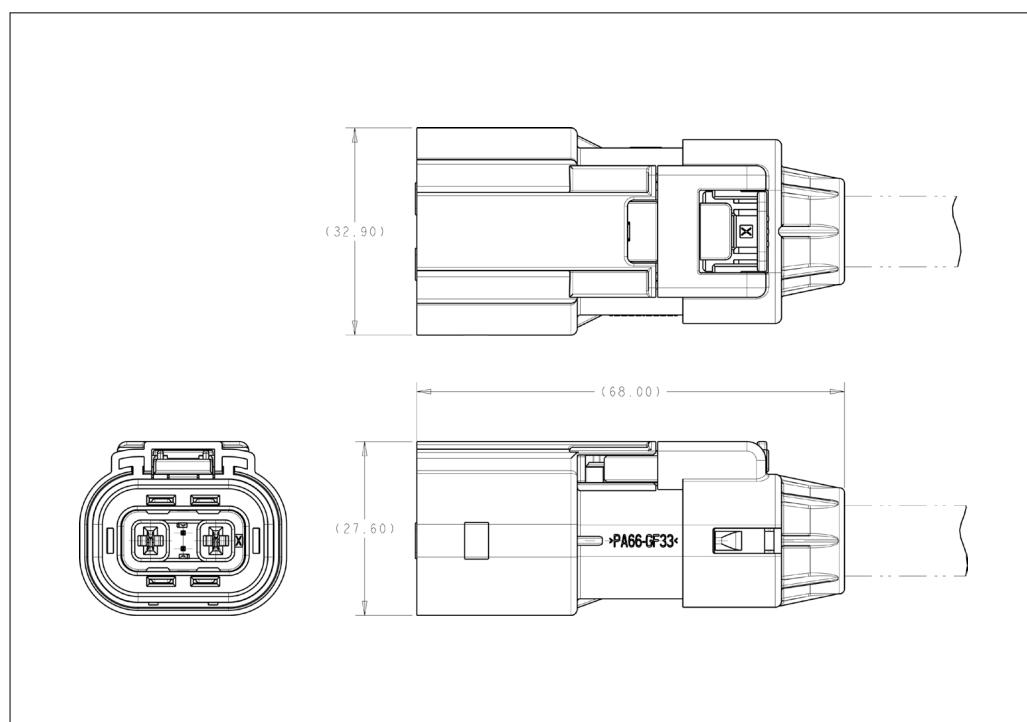
#### Product Specification:

108-32020

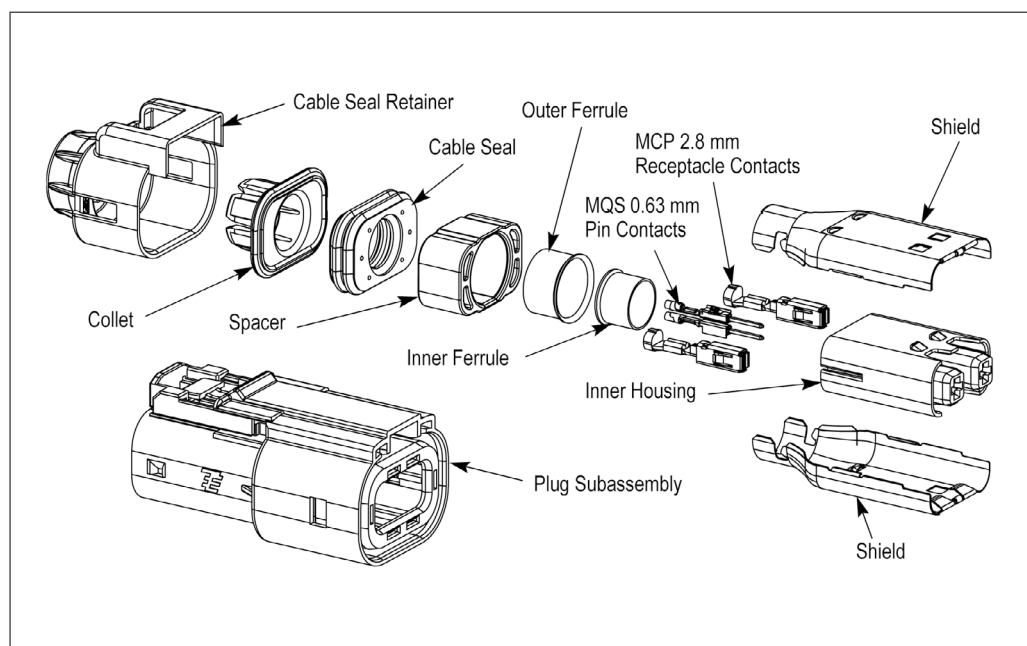
#### Application Specification:

114-13310

## AMP+ HVA 280 2p hm - Pass Through HVIL Plug



2103163 \*(Pass through) and 2103436 \*(Pass through)



\* Drawing number is NOT the order number!



### Applications

- DC / DC Converter
- HV Heater
- HV Climate Compressor
- On-Board Charger

### Technical Features

#### Poles:

2

#### Wire Type:

Single-core

#### Temperature Range:

-40°C up to 125°C

#### IP Rating, Mated:

IP67, IP6K9K

#### IP Rating, Unmated:

IP2XB

#### HV Interlock Option:

Integrated, internal

#### Latch Access Type:

Finger accessible

#### CPA:

Yes

#### Fire Classification:

HB

#### Vibration Level:

SG 2 (LV 215-1)

#### Shielding / Options:

Yes

#### EMC Shielding Resistance:

10 mΩ

#### Available Codings:

Z

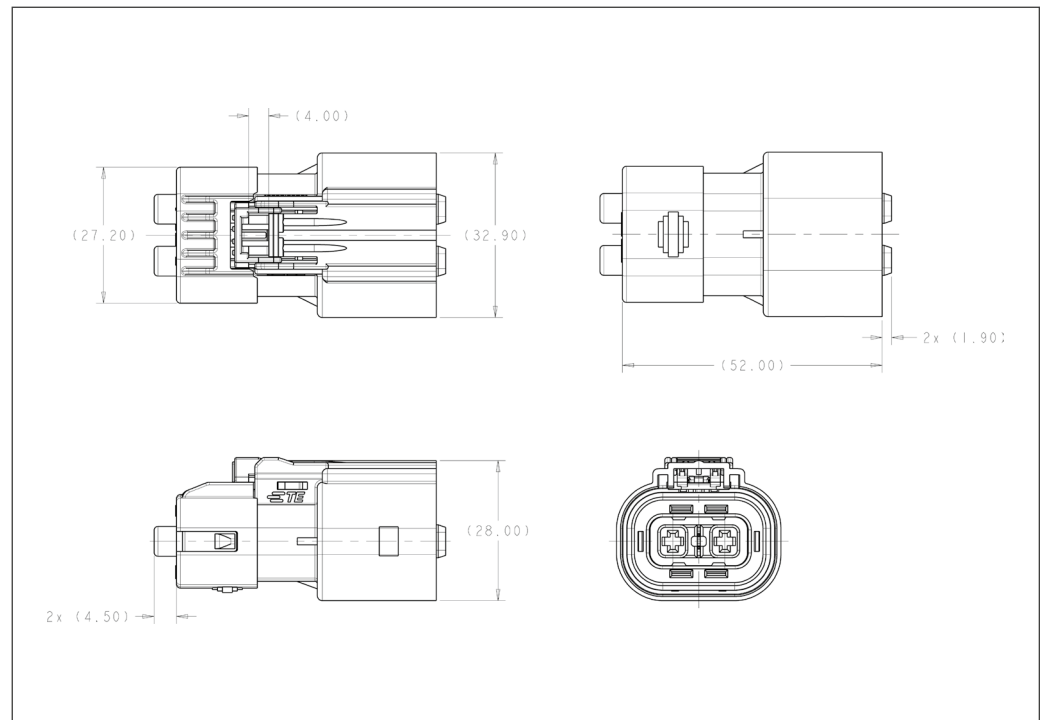
#### Product Specification:

108-2394

#### Application Specification:

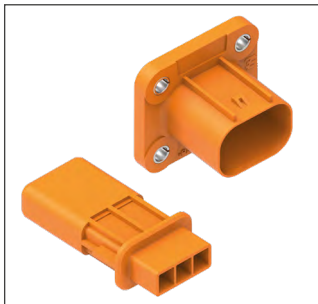
114-13259

## AMP+ HVA 280 2p hi SE - Intelligent Plug (Single Click)



Drawing 2103744 \*

\* Drawing number is NOT the order number!



### Applications

- DC / DC Converter
- HV Heater
- HV Climate Compressor
- On-Board Charger

### Technical Features

#### Poles:

2 or 3

#### Tab Size:

2.8 mm

#### Voltage Rating:

up to 850 VDC  
(depending on mating plug)

#### Temperature Range:

-40°C up to 140°C

#### Current Carrying Capability:

Derating factor of 10%  
40 A at 85°C

#### IP Rating, Mated:

IP67, IP6K9K

#### IP Rating, Unmated:

IP2XB

#### HV Interlock Option:

Integrated, internal (only for 2p)

#### Fire Classification:

HB

#### Vibration Level:

SG 2 (LV 215-1)

#### Shielding / Options:

Yes

#### EMC Shielding Resistance:

10 mΩ

#### Available Codings:

A, B, D, E, F

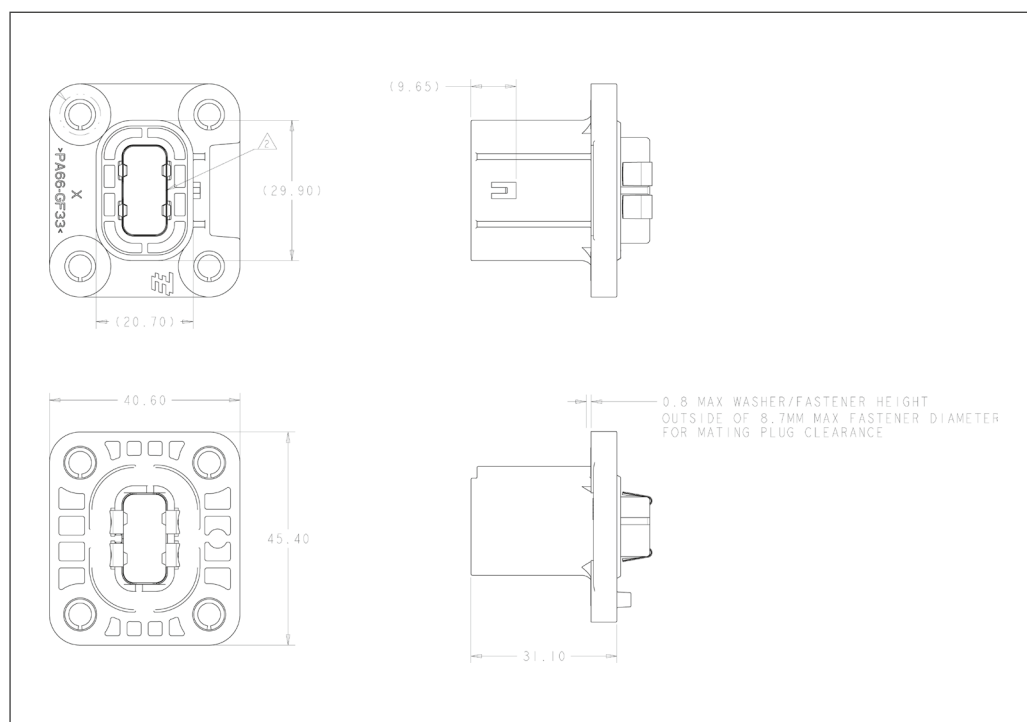
#### Product Specification:

108-32045

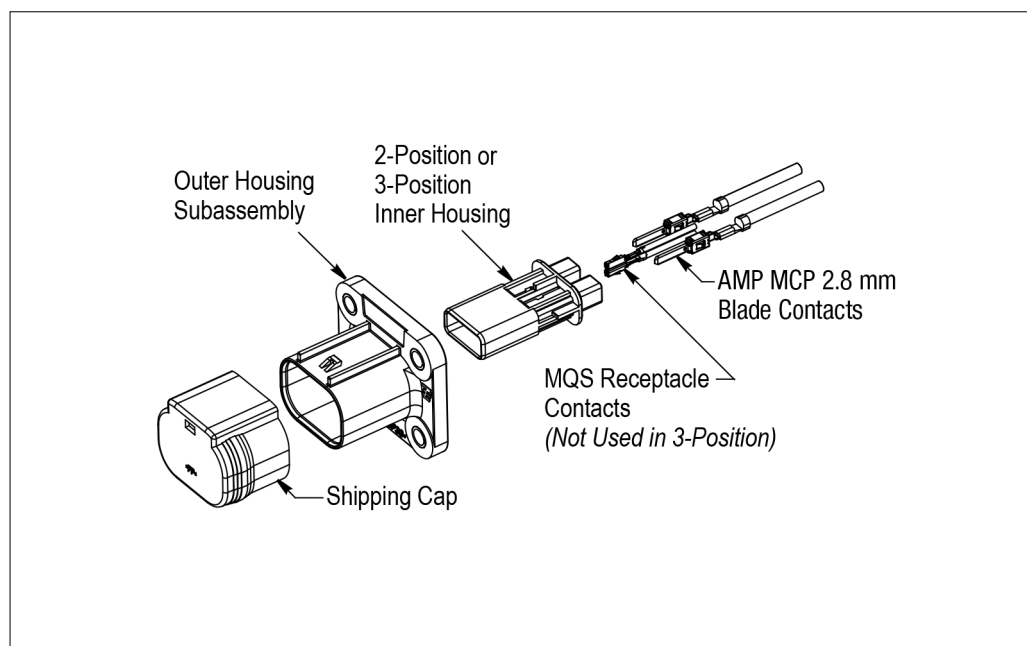
#### Application Specification:

408-32095

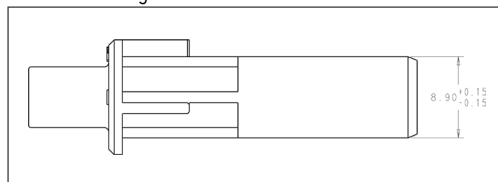
## AMP+ HVA 280 2p hi /3p xi – Discrete Header



Drawing 2103247 \* (2P), 2103321 \* (3P)

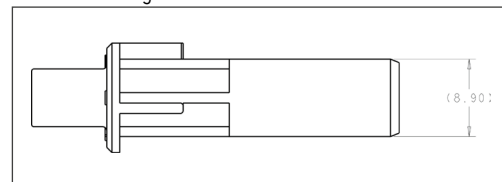


3P Inner Housing



Drawing 2103321 \*

2P Inner Housing



Drawing 2103245 \*

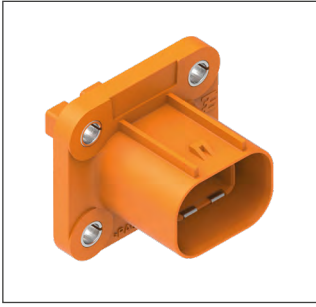
### Mating Plugs

2P Header: Page 19 – 23, 31, 32

3P Header: Page 29, 30

\* Drawing number is NOT the order number!





### Applications

- DC / DC Converter
- HV Heater
- HV Climate Compressor
- On-Board Charger

### Technical Features

#### Poles:

2

#### Tab Size:

2.8 mm

#### Voltage Rating:

up to 850 VDC

(depending on mating plug)

#### Temperature Range:

-40°C up to 140°C

#### Current Carrying Capability:

Derating factor of 10%

40 A at 85°C

#### IP Rating, Mated:

IP67, IP6K9K

#### IP Rating, Unmated:

IP2XB

#### HV Interlock Option:

Integrated, internal

#### Fire Classification:

HB

#### Vibration Level:

SG 2 (LV 215-1)

#### Shielding / Options:

Yes (Tin/Silver)

#### EMC Shielding Resistance:

10 mΩ

#### Available Codings:

A, B, D, E, F

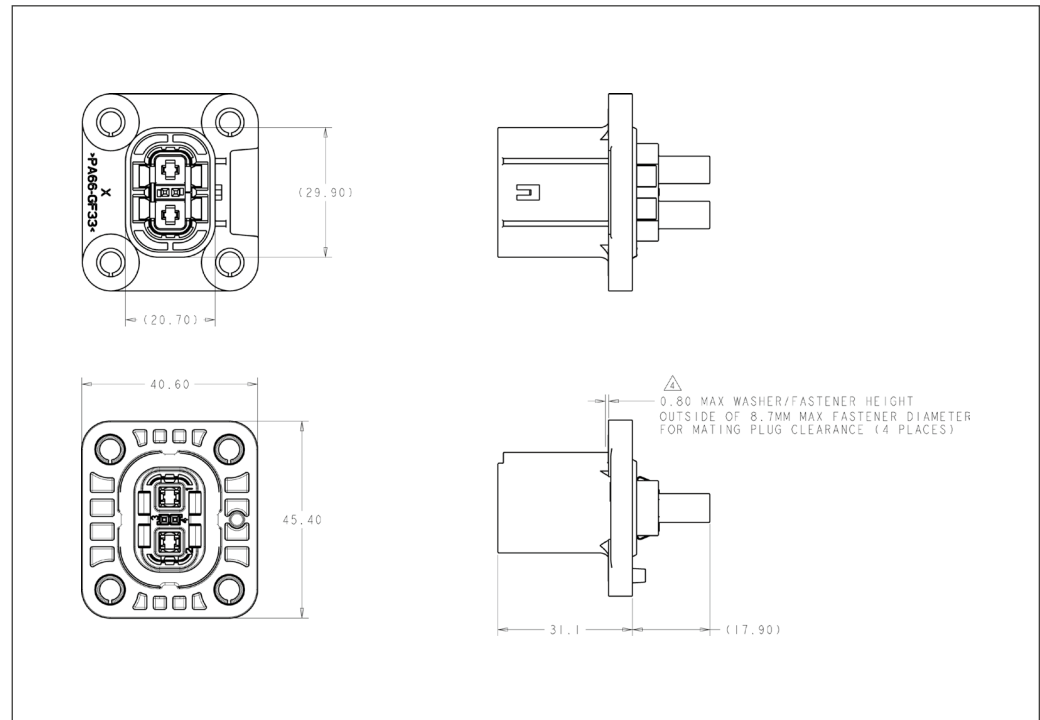
#### Product Specification:

108-32020

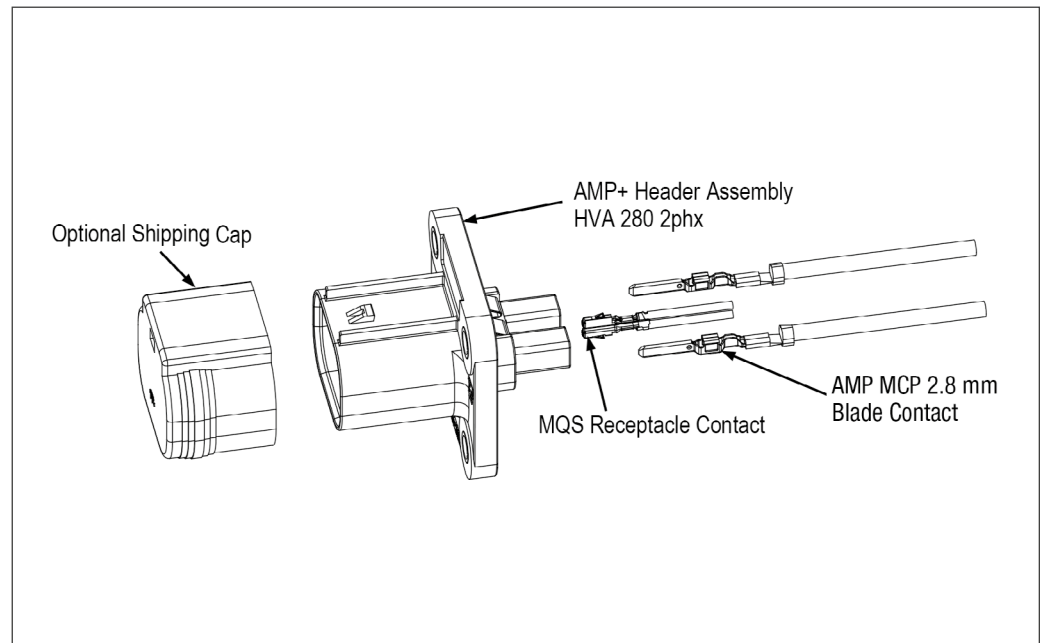
#### Application Specification:

408-10441

## AMP+ HVA 280 2p hx - 1 Piece Header



Drawing 2103124 \*



### Mating Plugs

2P Header: Page 19 - 23, 31, 32

3P Header: Page 29, 30

\* Drawing number is NOT the order number!



### Applications

- DC / DC Converter
- HV Heater
- HV Climate Compressor
- On-Board Charger

### Technical Features

#### Poles:

2

#### Terminal Size / System:

AMP MCP 2.8

#### Conductor Cross-Sections:

2.5 mm<sup>2</sup> to 4 mm<sup>2</sup>

#### Wire Type:

Single-core

#### Voltage Rating:

600 VDC

#### Temperature Range:

-40°C up to 125°C

#### Current Carrying Capability:

Derating factor of 10%

40 A at 85°C

#### IP Rating, Mated:

IP67, IP6K9K

#### IP Rating, Unmated:

IP2XB

#### HV Interlock Option:

Integrated, external

#### Fire Classification:

HB

#### Vibration Level:

USCAR-2 Class V1

#### Shielding / Options:

Yes

#### EMC Shielding Resistance:

10 mΩ

#### Available Codings:

A, B, D, E, F

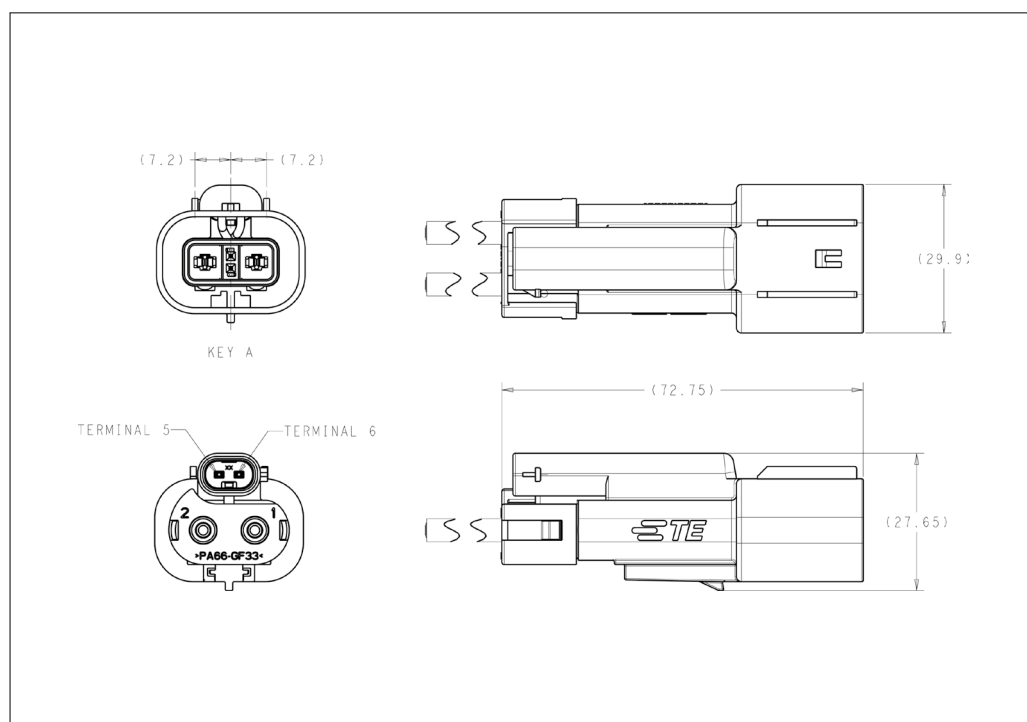
#### Product Specification:

In progress

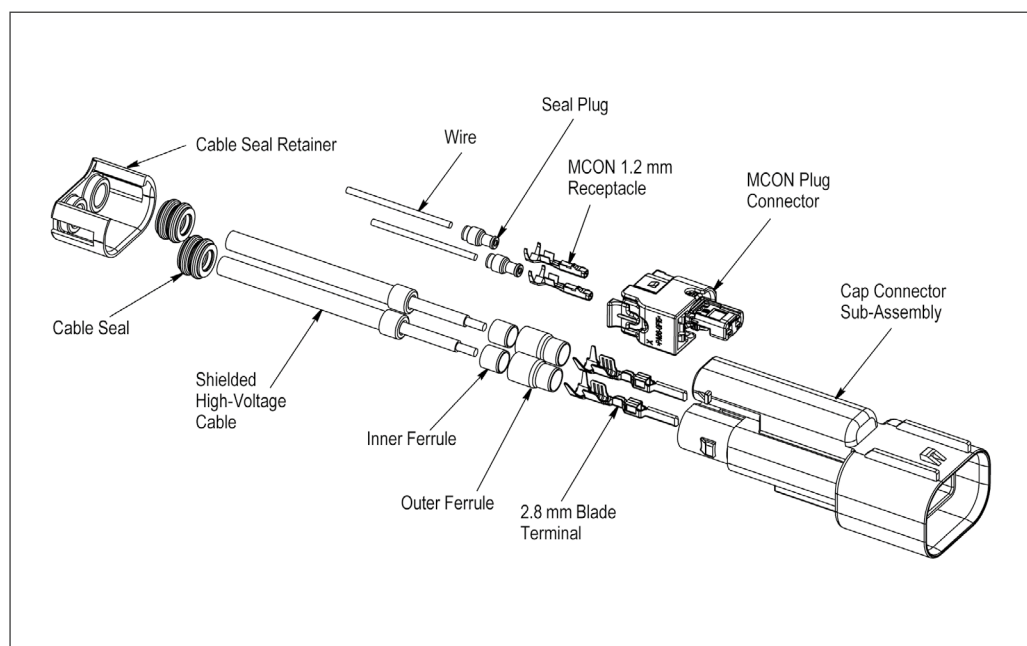
#### Application Specification:

114-32033

## AMP+ HVA 280 2p hi - Inline Cap



2103220 \* (Pass through), 2103221 \* (Pass through)



\* Drawing number is NOT the order number!



### Applications

- DC / DC Converter
- HV Heater
- HV Climate Compressor
- On-Board Charger

### Technical Features

#### Poles:

2

#### Terminal Size / System:

AMP MCP 2.8

#### Conductor Cross-Sections:

2.5 mm<sup>2</sup> to 4 mm<sup>2</sup>

#### Wire Type:

Multi-core

#### Voltage Rating:

up to 850 VDC

#### Temperature Range:

-40°C up to 140°C

#### Current Carrying Capability:

33 A at 85°C

#### IP Rating, Mated:

IP67, IP6K9K

#### IP Rating, Unmated:

IP2XB

#### HV Interlock Option:

Integrated, internal

#### Fire Classification:

HB

#### Vibration Level:

USCAR-2 Class V1

#### Shielding / Options:

Yes

#### EMC Shielding Resistance:

10 mΩ

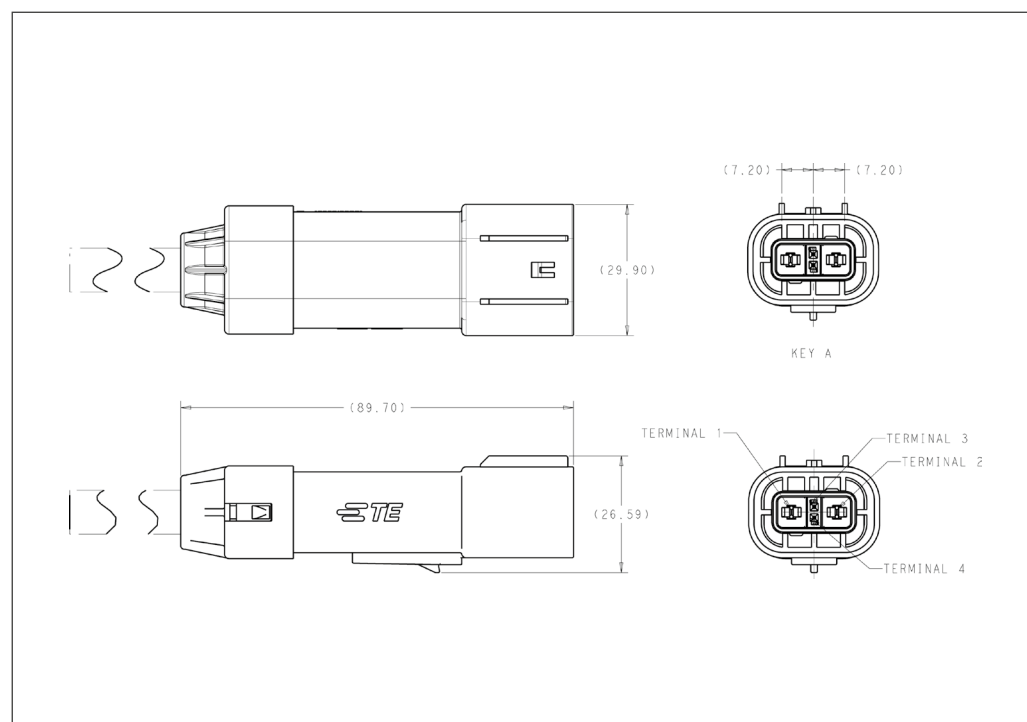
#### Available Codings:

A, B, D, E, F

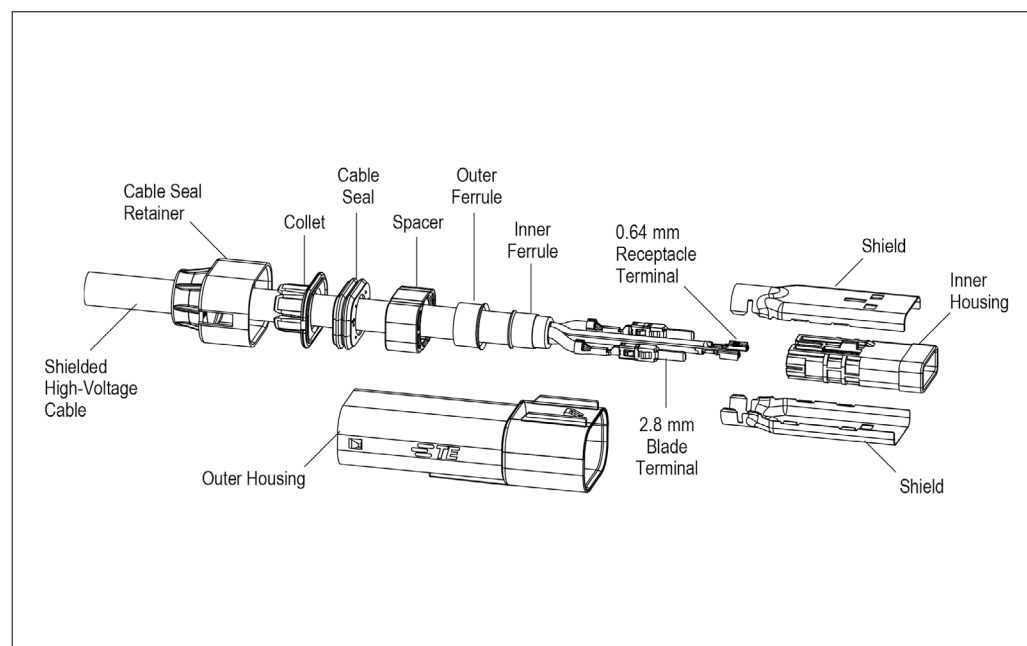
#### Application Specification:

114-32034

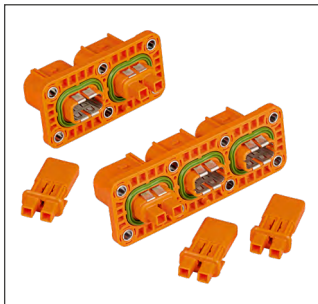
## AMP+ HVA 280 2p hm - Inline Cap



Drawing 2103219 \*



\* Drawing number is NOT the order number!



### Applications

- DC / DC Converter
- HV Heater
- HV Climate Compressor
- On-Board Charger

### Technical Features

#### Poles:

For 2-bay header 2x 2  
or 6 (according to inner housing)

For 3-bay header 3x 2  
or 9 (according to inner housing)

#### Tab Size:

2.8 mm

#### Conductor Cross-Sections:

4.0 mm<sup>2</sup>

#### Wire Type:

Single-core

#### Voltage Rating:

up to 850 VDC  
(depending on mating plug)

#### Temperature Range:

-40°C up to 125°C

#### Current Carrying Capability:

Derating factor of 10%  
up to 40 A at 85°C  
(depending on mating plug)

#### IP Rating, Mated:

IP67, IP6K9K

#### IP Rating, Unmated:

IP2XB

#### HV Interlock Option:

Integrated, internal (only for 2p)

#### Fire Classification:

HB

#### Vibration Level:

USCAR-2 Class V1

#### Shielding / Options:

Yes

#### EMC Shielding Resistance:

10 mΩ

#### Available Codings:

For 2-bay header option 1 A, E;  
option 2 D, F  
For 3-bay header A, D, E

#### Inner Housing:

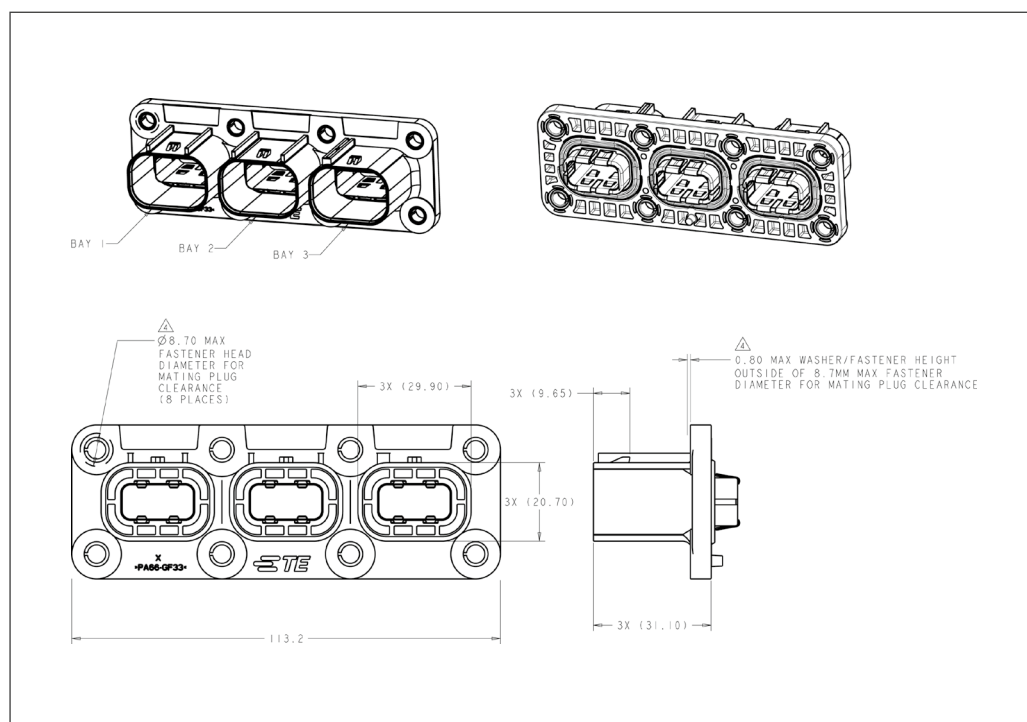
For 2 positions 2103245-X  
For 3 positions 2103321-X

### Mating Plugs

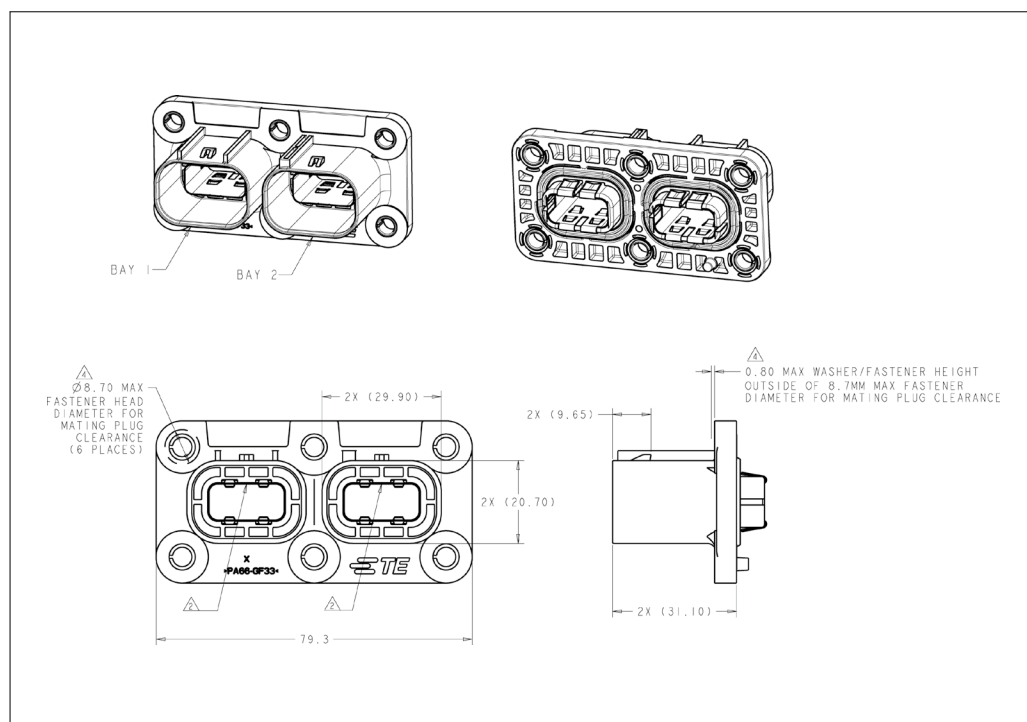
**2P Header:** Page 19 to 23, 31, 32

**3P Header:** Page 29, 30

## AMP+ HVA 280 2p hi / 3p xi - Multi-Bay Discrete Header



Drawing 2103340 \*



Drawing 2103346 \*

\* Drawing number is NOT the order number!



### Applications

- DC / DC Converter
- HV Heater
- HV Climate Compressor
- On-Board Charger

### Technical Features

#### Poles:

3

#### Terminal Size / System:

AMP MCP 2.8

#### Conductor Cross-Sections:

2.5 mm<sup>2</sup> to 4 mm<sup>2</sup>

#### Wire Type:

Multi-core

#### Voltage Rating:

850 VDC

#### Temperature Range:

-40°C up to 140°C

#### Current Carrying Capability:

24 A at 85°C

#### IP Rating, Mated:

IP67, IP6K9K

#### IP Rating, Unmated:

IP2XB

#### Fire Classification:

HB

#### Vibration Level:

USCAR-2 Class V1

#### Shielding / Options:

Yes

#### EMC Shielding Resistance:

10 mΩ

#### Available Codings:

A, B, D, E, F and AK severity 2 (body-sealed)

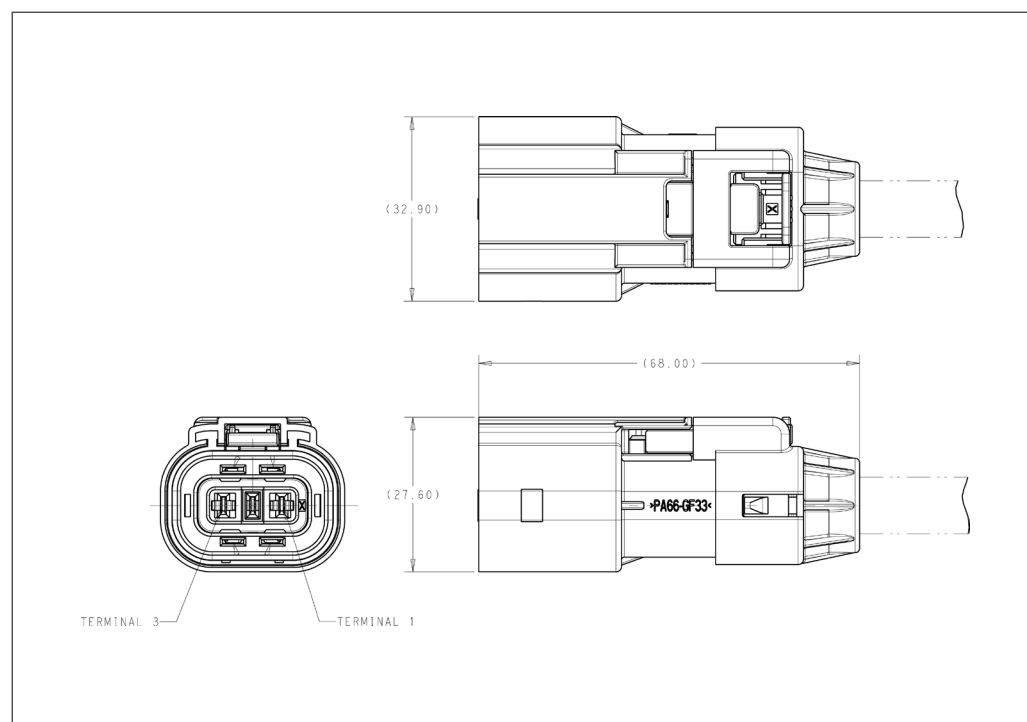
#### Product Specification:

108-32020

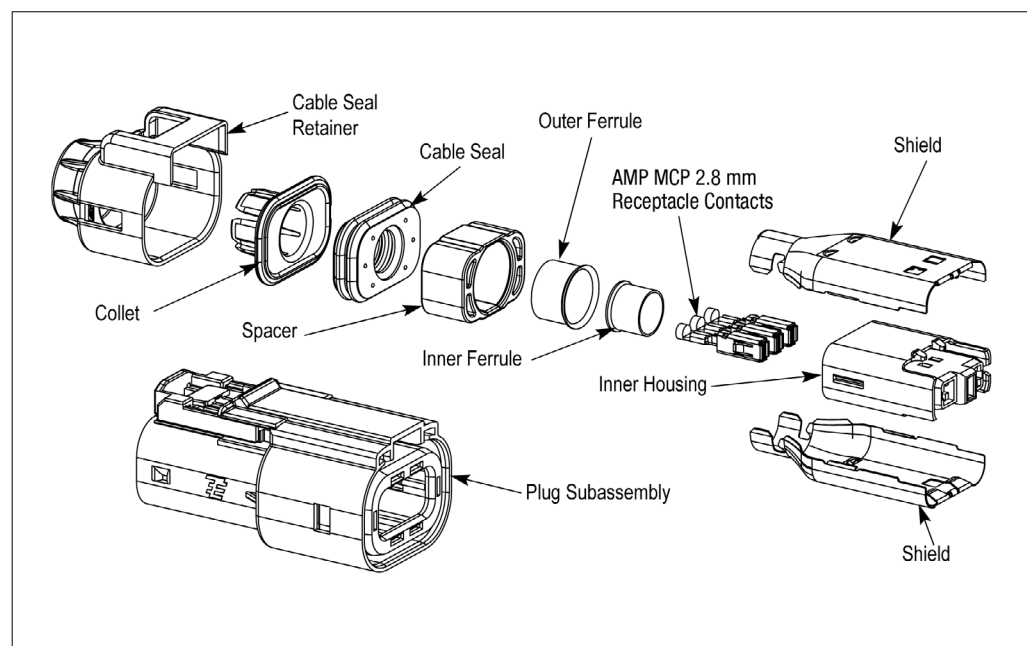
#### Application Specification:

114-32056

## AMP+ HVA 280 3p xm XE - Plug



Drawing 2103309 \*



\* Drawing number is NOT the order number!



### Applications

- DC / DC Converter
- HV Heater
- HV Climate Compressor
- On-Board Charger

### Technical Features

#### Poles:

3

#### Terminal Size / System:

AMP MCP 2.8

#### Conductor Cross-Sections:

2.5 mm<sup>2</sup> to 4 mm<sup>2</sup>

#### Wire Type:

Multi-core

#### Voltage Rating:

850 VDC

#### Temperature Range:

-40°C up to 140°C

#### Current Carrying Capability:

24 A at 85°C

#### IP Rating, Mated:

IP67, IP6K9K

#### IP Rating, Unmated:

IP2XB

#### Fire Classification:

HB

#### Vibration Level:

USCAR-2 Class V1

#### Shielding / Options:

Yes

#### EMC Shielding Resistance:

10 mΩ

#### Available Codings:

A, B, D, E, F

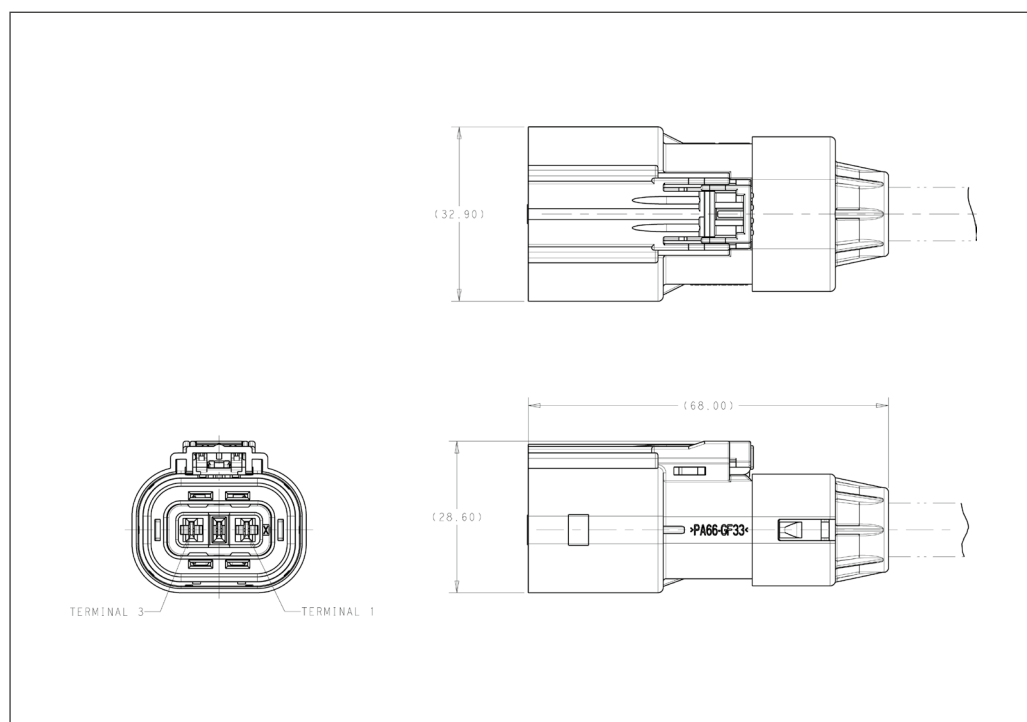
#### Product Specification:

108-32077

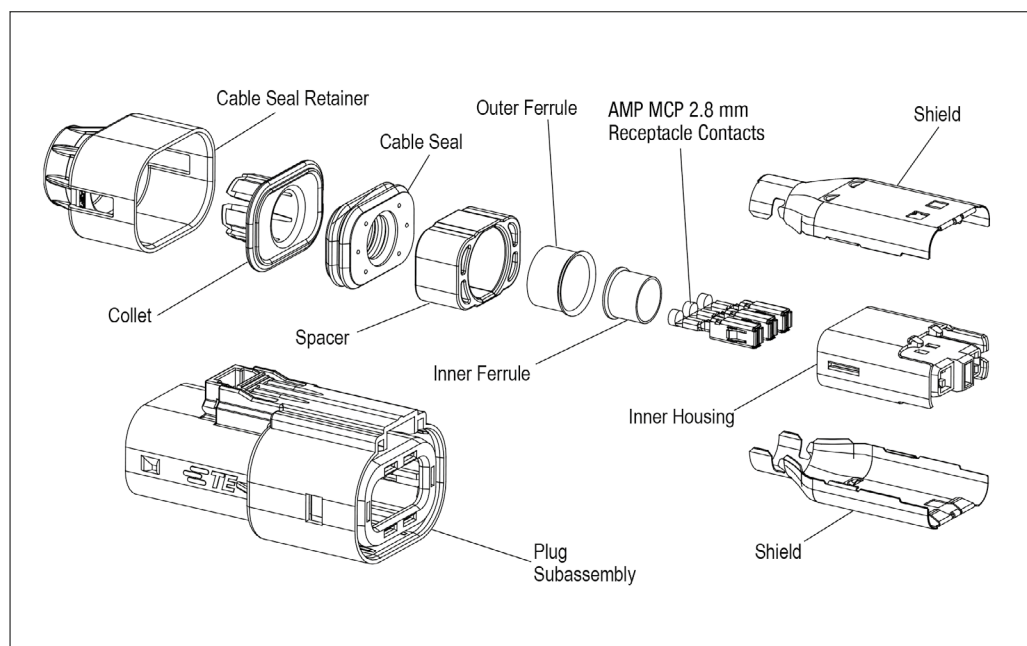
#### Application Specification:

114-32125

## AMP+ HVA 280 3p xm XE - Plug (Single Click)



Drawing 2103533 \*



\* Drawing number is NOT the order number!



### Applications

- DC / DC Converter
- HV Heater
- HV Climate Compressor
- On-Board Charger

### Technical Features

#### Poles:

2

#### Terminal Size / System:

AMP MCP 2.8

#### Conductor Cross-Sections:

2.5 mm<sup>2</sup> to 4 mm<sup>2</sup>

#### Wire Type:

Multi-core

#### Voltage Rating:

850 VDC

#### Temperature Range:

-40°C up to 140°C

#### Current Carrying Capability:

33 A at 85°C

#### IP Rating, Mated:

IP67, IP6K9K

#### IP Rating, Unmated:

IP2XB

#### HV Interlock Option:

Integrated, internal

#### Fire Classification:

HB

#### Vibration Level:

USCAR-2 Class V1, SG 2 (LV 215-1)

#### Shielding / Options:

Yes

#### EMC Shielding Resistance:

10 mΩ

#### Available Codings:

A, B, D, E, F

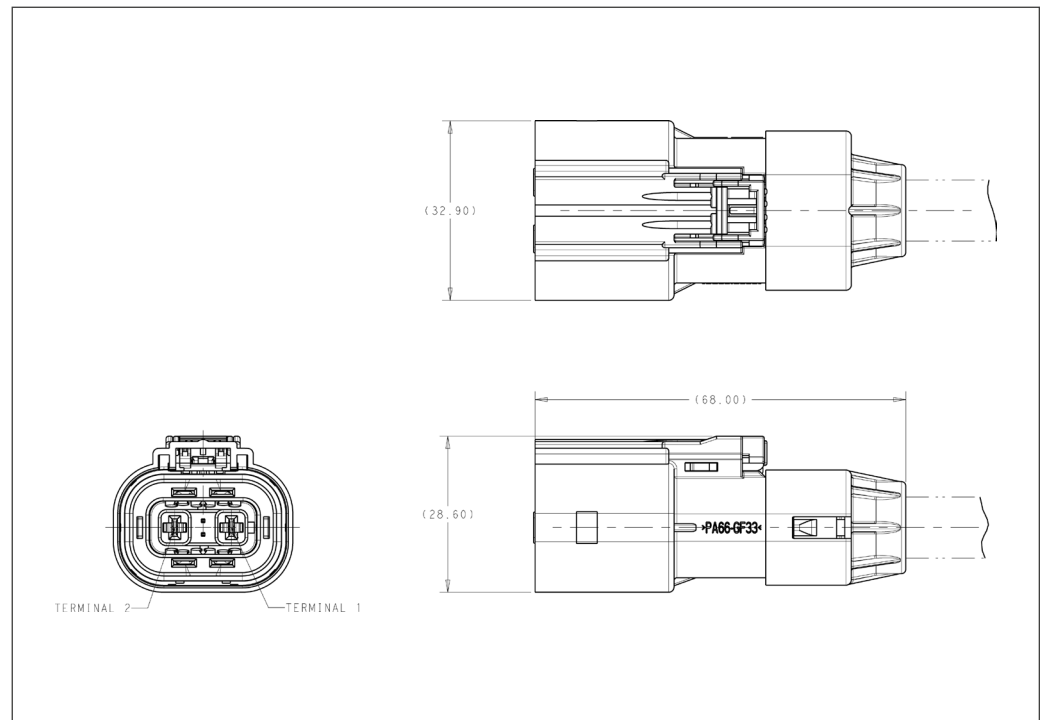
#### Product Specification:

108-32077

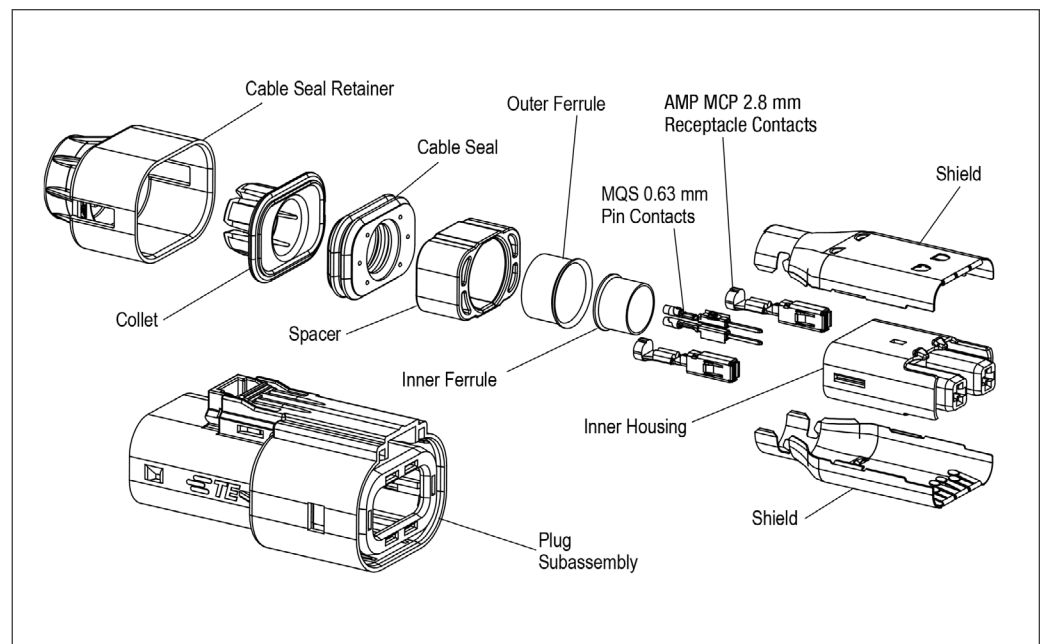
#### Application Specification:

114-32124

## AMP+ HVA 280 2p hm - Pass-Through Plug (Single Click)



Drawing 2103531 \*



\* Drawing number is NOT the order number!





### Applications

- DC / DC Converter
- HV Heater
- HV Climate Compressor
- On-Board Charger

### Technical Features

#### Poles:

2

#### Terminal Size / System:

AMP MCP 2.8

#### Conductor Cross-Sections:

2.5 mm<sup>2</sup> to 4 mm<sup>2</sup>

#### Wire Type:

Multi-core

#### Voltage Rating:

850 VDC

#### Temperature Range:

-40°C up to 140°C

#### Current Carrying Capability:

33 A at 85°C

#### IP Rating, Mated:

IP67, IP6K9K

#### IP Rating, Unmated:

IP2XB

#### HV Interlock Option:

Integrated, internal

#### Fire Classification:

HB

#### Vibration Level:

USCAR-2 Class V1, SG 2 (LV 215-1)

#### Shielding / Options:

Yes

#### EMC Shielding Resistance:

10 mΩ

#### Available Codings:

A, B, D, E, F

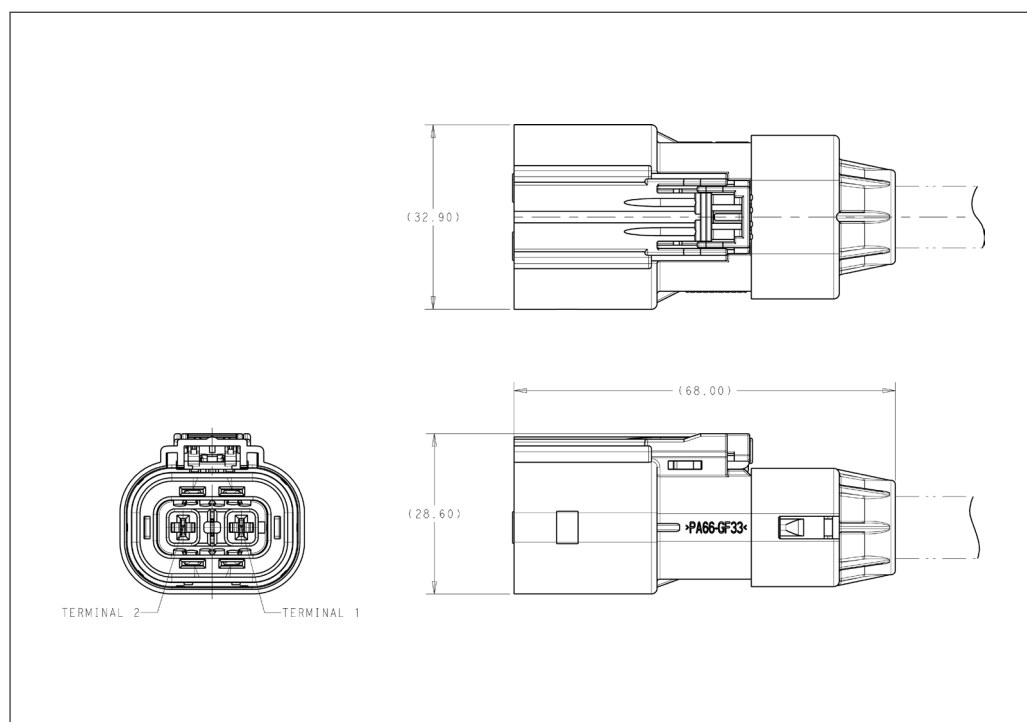
#### Product Specification:

108-32077

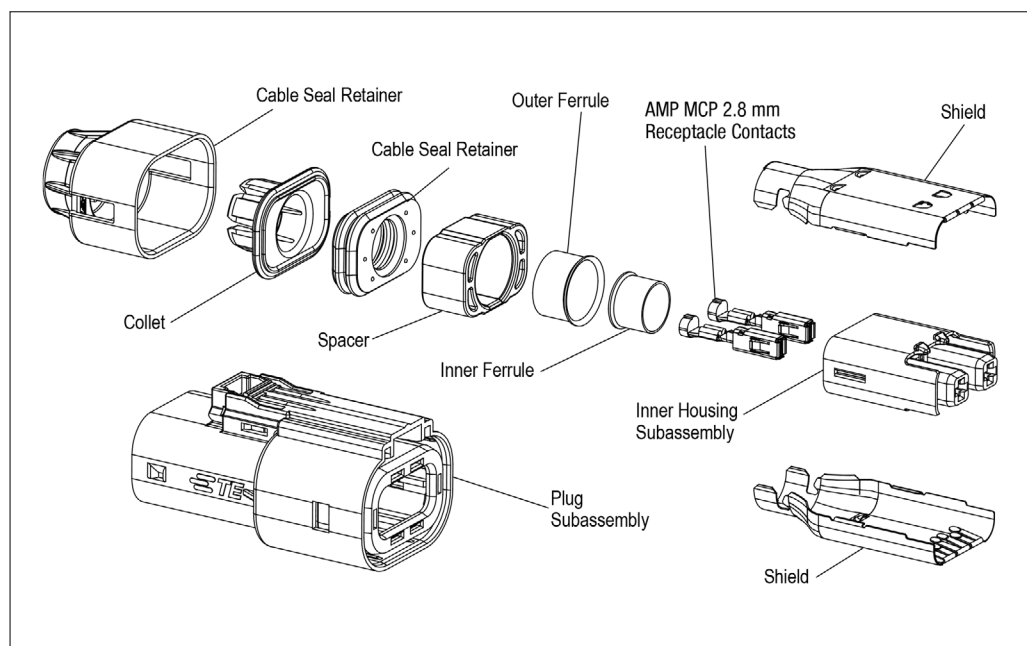
#### Application Specification:

114-32123

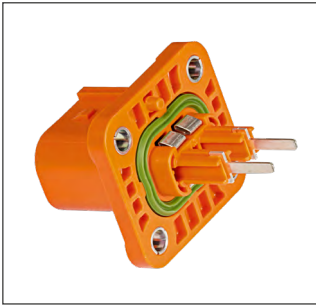
## AMP+ HVA 280 2p hm - Shunted Plug (Single Click)



Drawing 2103532 \*



\* Drawing number is NOT the order number!



### Applications

- DC / DC Converter
- HV Heater
- HV Climate Compressor
- On-Board Charger

### Technical Features

#### Poles:

2

#### Terminal Size / System:

AMP MCP 2.8

#### Tab Size:

2.8 mm

#### Wire Type:

Single-core

#### Tab Size:

0.8 x 2.8 mm

#### Voltage Rating:

Derating factor of 10%

40 A at 85°C

(depending on mating plug)

#### Temperature Range:

-40°C up to 140°C

#### Current Carrying Capability:

40 A at 85°C

#### IP Rating, Mated:

IP67, IP6K9K

#### IP Rating, Unmated:

IP2XB

#### HV Interlock Option:

Integrated, internal

#### Fire Classification:

HB

#### Vibration Level:

USCAR-2 Class V1

#### Shielding / Options:

Yes

#### EMC Shielding Resistance:

10 mΩ

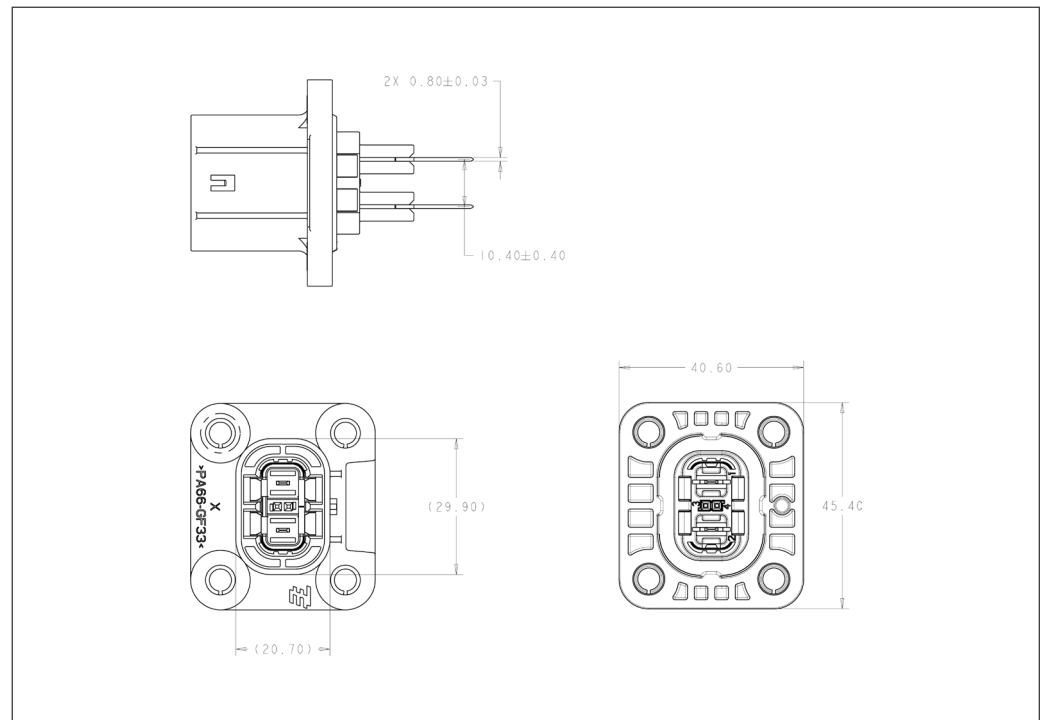
#### Available Codings:

A, B, D, E, F

#### Application Specification:

408-10441

## AMP+ HVA 280 2p - Header (Stitched)



Drawing 2103396 \*

### Mating Plugs

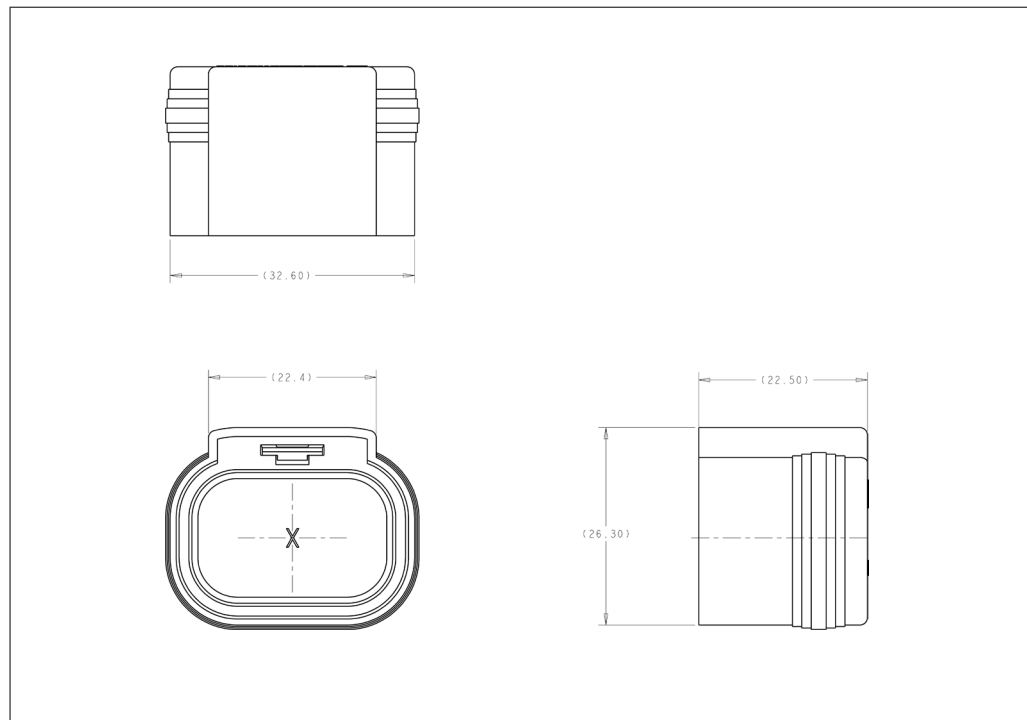
**2P Header:** Page 19 to 23, 31, 32

**3P Header:** Page 29, 30

\* Drawing number is NOT the order number!

**Applications**

- DC / DC Converter
- HV Heater
- HV Climate Compressor
- On-Board Charger

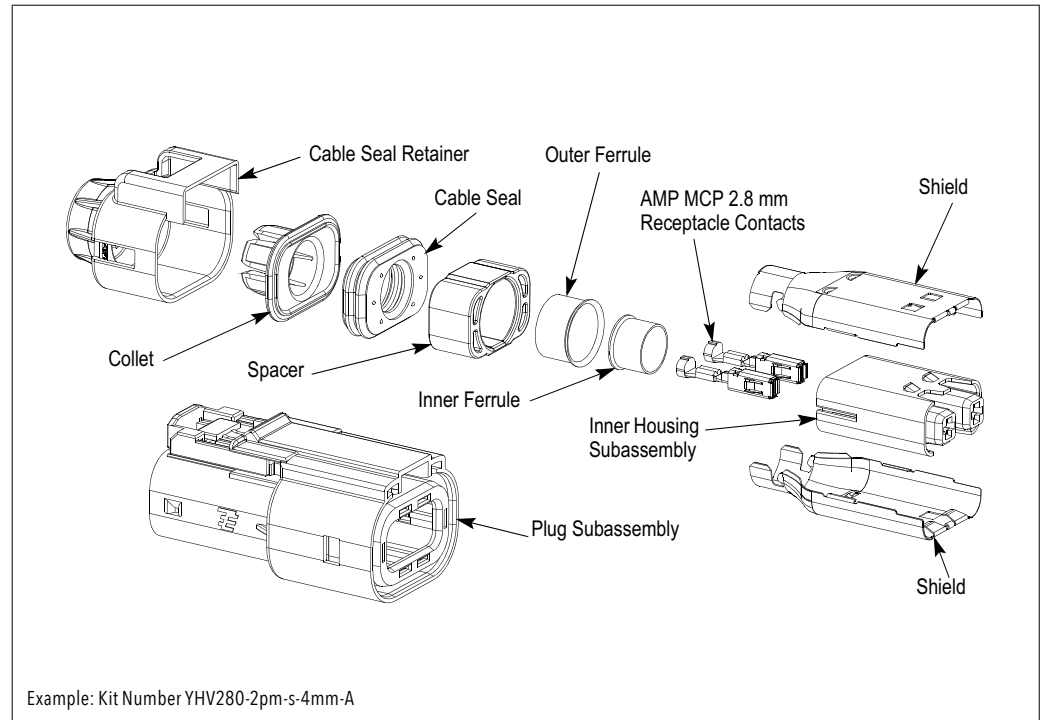
**AMP+ HVA 280 – Shipping Caps**

Drawing 1587733 \*

Shipping caps fit TE standard headers

\* Drawing number is NOT the order number!

## AMP+ HVA 280 Connector System Kits

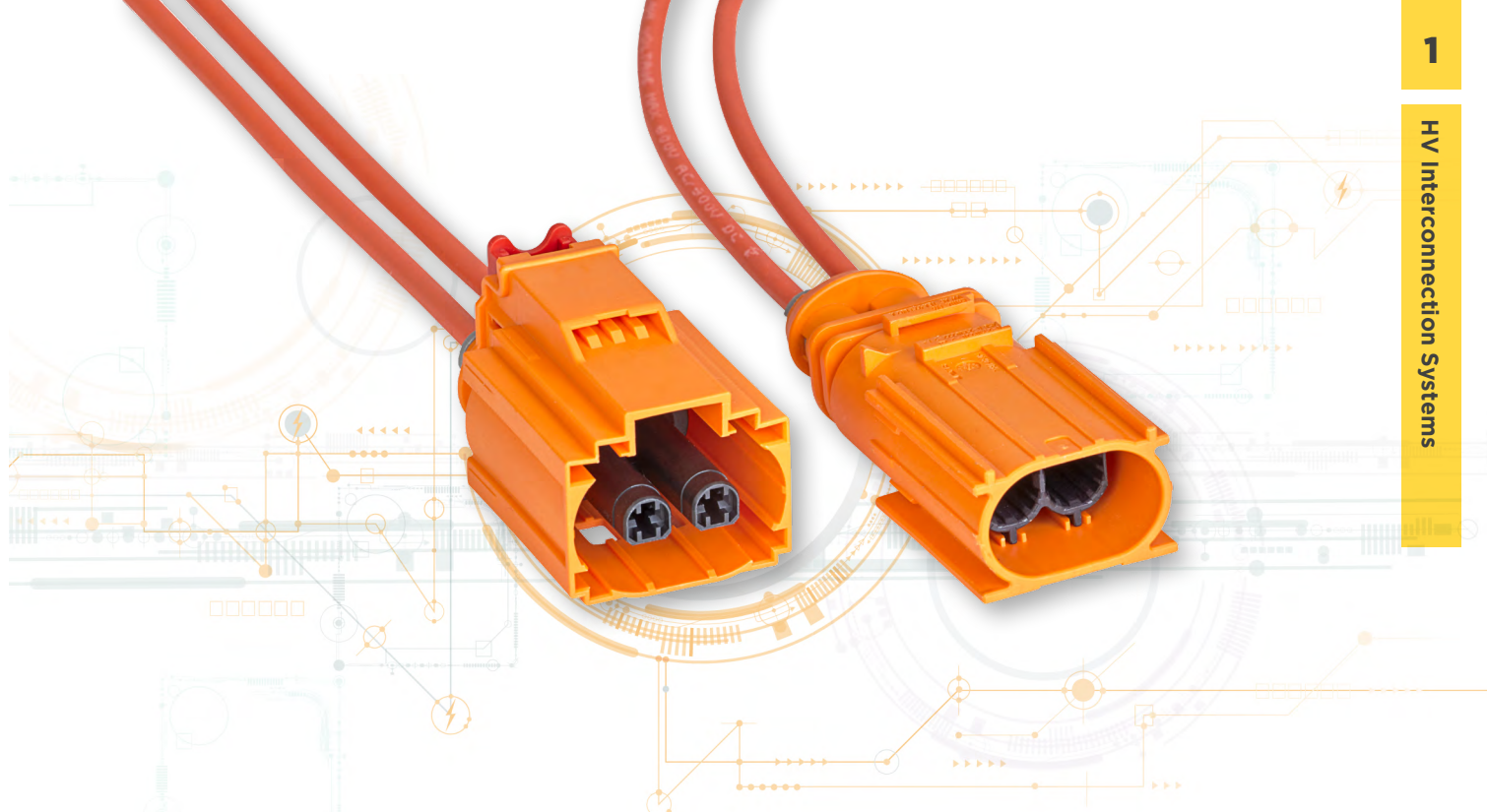


## AMP+ HVA 280 Connector System Kits \*)

| Connector | Position | Cable (mm <sup>2</sup> ) | Cable Type                  | HVIL Type      | Key | LADD Connector Kit Number | Mating Header Part Number                            | LADD Header Kit Number |
|-----------|----------|--------------------------|-----------------------------|----------------|-----|---------------------------|------------------------------------------------------|------------------------|
| HVA 280   | 2        | 4                        | Individually shielded cable | Shunted HVIL   | A   | YHVA280-2phi-4mm-A        | 2103124-1                                            | YHVA280-2phx-hdr-A     |
|           |          |                          |                             |                | B   | YHVA280-2phi-4mm-B        | 2103124-2                                            | YHVA280-2phx-hdr-B     |
|           |          |                          |                             | Shunted HVIL   | A   | YHV280-2pm-s-4mm-A        | 2103124-1                                            | YHVA280-2phx-hdr-A     |
|           |          |                          |                             |                | B   | YHV280-2pm-s-4mm-B        | 2103124-2                                            | YHVA280-2phx-hdr-B     |
|           |          |                          | Multicore cable             | Shunted HVIL   | D   | YHV280-2pm-s-4mm-D        | 2103124-4                                            | YHVA280-2phx-hdr-D     |
|           |          |                          |                             |                | E   | YHV280-2pm-s-4mm-E        | 2103124-5                                            | YHVA280-2phx-hdr-E     |
|           |          |                          |                             | Pass-thru HVIL | A   | YHV280-2pm-p-4mm-A        | 2103124-1                                            | YHVA280-2phx-hdr-A     |
|           |          |                          |                             |                | B   | YHV280-2pm-p-4mm-B        | 2103124-2                                            | YHVA280-2phx-hdr-B     |
|           |          |                          |                             |                | D   | YHV280-2pm-p-4mm-D        | 2103124-4                                            | YHVA280-2phx-hdr-D     |
|           |          |                          |                             |                | E   | YHV280-2pm-p-4mm-E        | 2103124-5                                            | YHVA280-2phx-hdr-E     |
|           | 3        | 2.5                      | Multicore cable             | No HVIL        | A   | YHVA280-3pxm-A-000        | Outer housing: 2103247-1<br>Inner housing: 2103321-1 | YHVA280-3phx-hdr-A     |
|           |          |                          |                             |                | B   | YHVA280-3pxm-B-000        | Outer housing: 2103247-2<br>Inner housing: 2103321-2 | YHVA280-3phx-hdr-B     |

\*) Kits include HVIL terminals





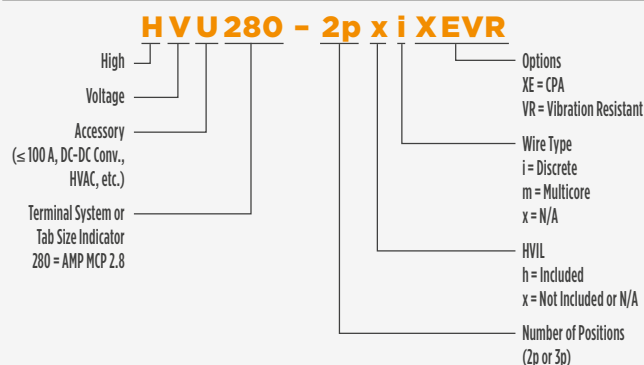
## AMP+ HVU 280 HV UNSHIELDED INTERCONNECTION SYSTEM INTRODUCTION

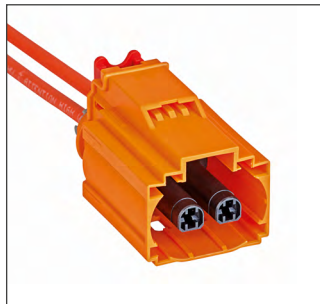
In addition to the shielded versions in the respective current classes unshielded HV interconnection systems now complete the HV interconnection systems portfolio. In class 1, the AMP+ HVU 280 HV interconnection system is available as finger-proof, touch-safe two-pole system.

The HVU 280 connector system features improved packaging and manufacturing efficiency. In addition, the connector isolation ensures finger protection according to UL standard. For the header V0 flame resistant isolation material was used.

Applications include DC/DC converter, on-board charger, electric heater and electric climate compressor. The unshielded HVU 280 is a high-performing and very flexible class 1 interconnection system using our proven AMP MCP 2.8 terminal.

### Naming Convention HVU 280 Interconnection System





### Applications

- DC / DC Converter
- HV Heater
- HV Climate Compressor
- On-Board Charger

### Technical Features

#### Poles:

2

#### Terminal Size / System:

AMP MCP 2.8

#### Conductor Cross-Sections:

2.5 mm<sup>2</sup> to 4 mm<sup>2</sup>

#### Wire Type:

Single-core

#### Voltage Rating:

1,000 VDC

#### Temperature Range:

-40°C up to 140°C

#### Current Carrying Capability:

30 A at 85°C (4 mm<sup>2</sup>)

#### IP Rating, Mated:

IP67, IP6K9K, ISO 20653: IP2XD

#### IP Rating, Unmated:

IPXXB+ (UL finger + 2 mm / 30 N)

#### HV Interlock Option:

Tool accessible

#### CPA:

Yes

#### Fire Classification:

HB

#### Vibration Level:

SG 3 (LV 215-1)

#### Shielding / Options:

N/A

#### EMC Shielding Resistance:

N/A

#### Available Codings:

A, B, D, E, F

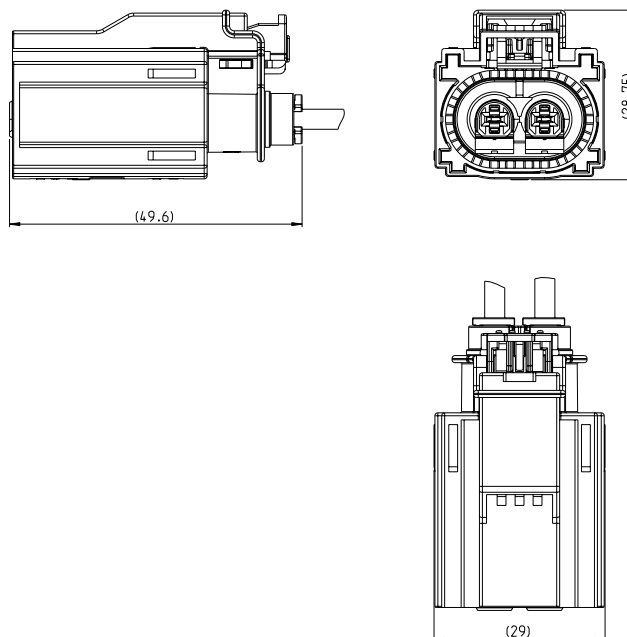
#### Product Specification:

108-94679

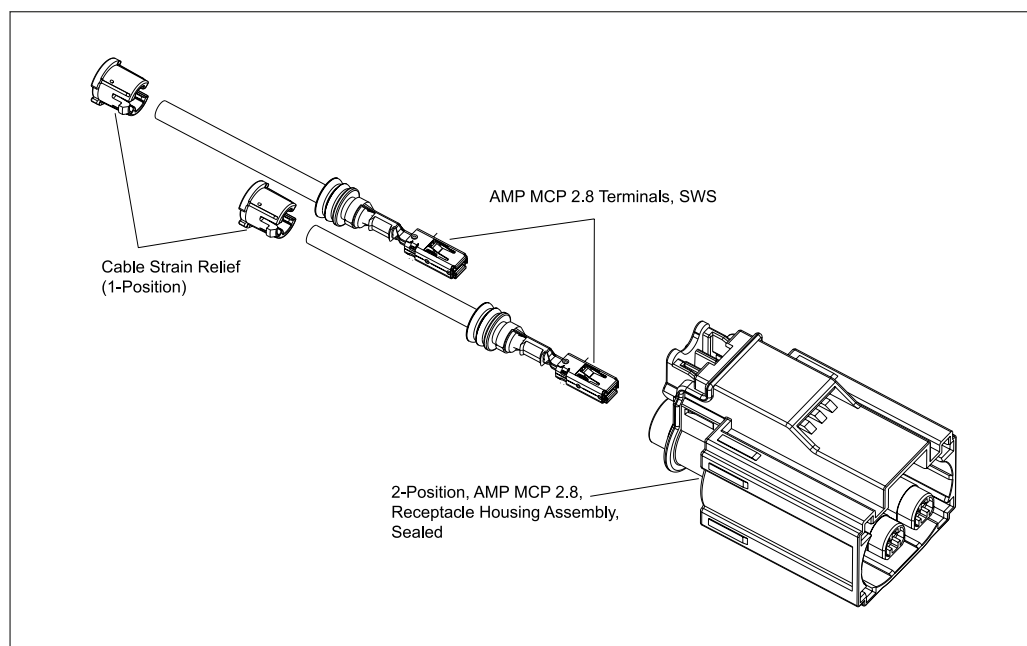
#### Application Specification:

114-94554

## AMP+ HVU 280 2p xi XE - Plug



Drawing 2322438 \*



\* Drawing number is NOT the order number!





### Applications

- DC / DC Converter
- HV Heater
- HV Climate Compressor
- On-Board Charger

### Technical Features

#### Poles:

2

#### Conductor Cross-Sections:

2.5 mm<sup>2</sup> to 4 mm<sup>2</sup>

#### Wire Type:

Single-core

#### Tab Size:

2.8 mm x 0.8 mm

#### Voltage Rating:

1,000 VDC

#### Temperature Range:

-40°C up to 140°C

#### Current Carrying Capability:

30 A at 85°C (4 mm<sup>2</sup>)

#### IP Rating, Mated:

IP67, IP6K9K, ISO 20653: IP2XD

#### IP Rating, Unmated:

IPXXB+ (UL finger + 2 mm / 30 N)

#### Latch Access Type:

Tool accessible

#### Fire Classification:

V0

#### Vibration Level:

SG 3 (LV 215-1)

#### Shielding / Options:

N/A

#### EMC Shielding Resistance:

N/A

#### Available Codings:

A, B, D, E, F

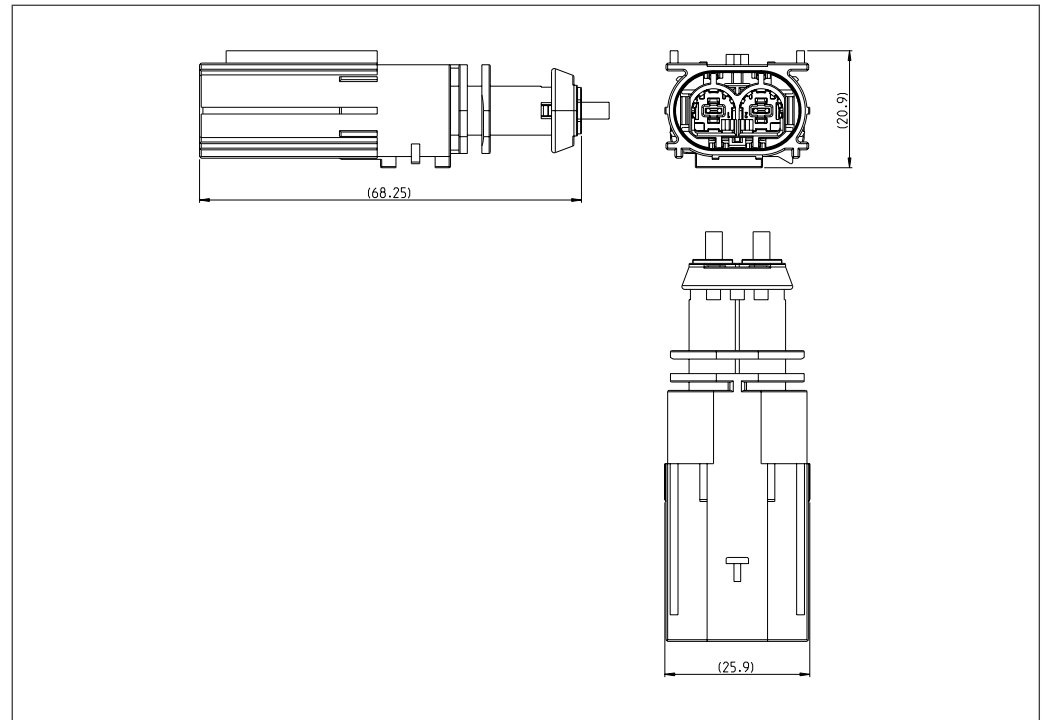
#### Product Specification:

108-94679

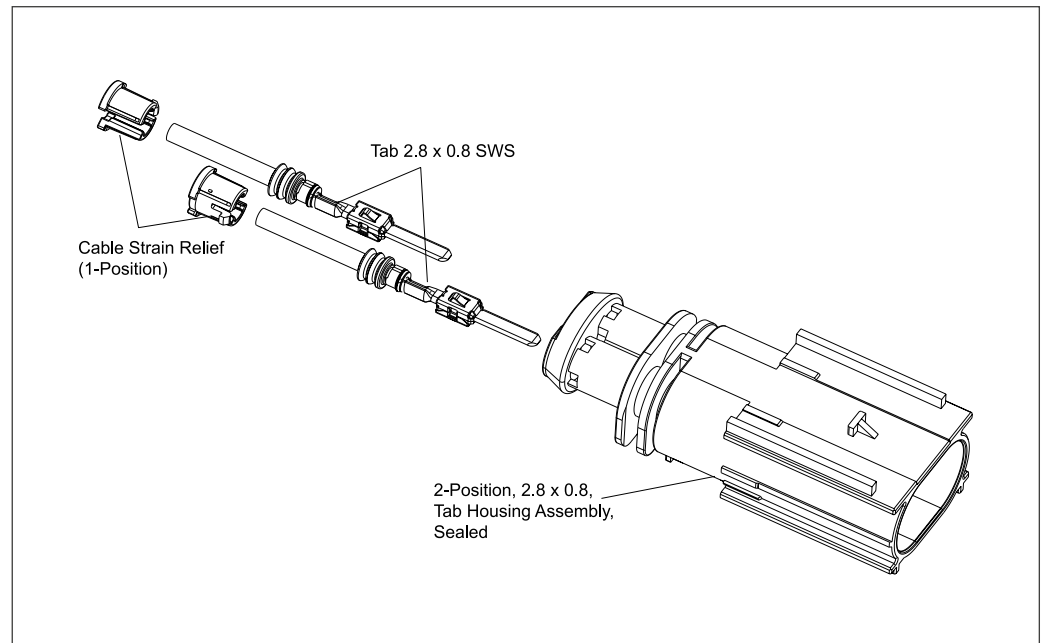
#### Application Specification:

114-94554

## AMP+ HVU 280 2p xi - Inline Cap

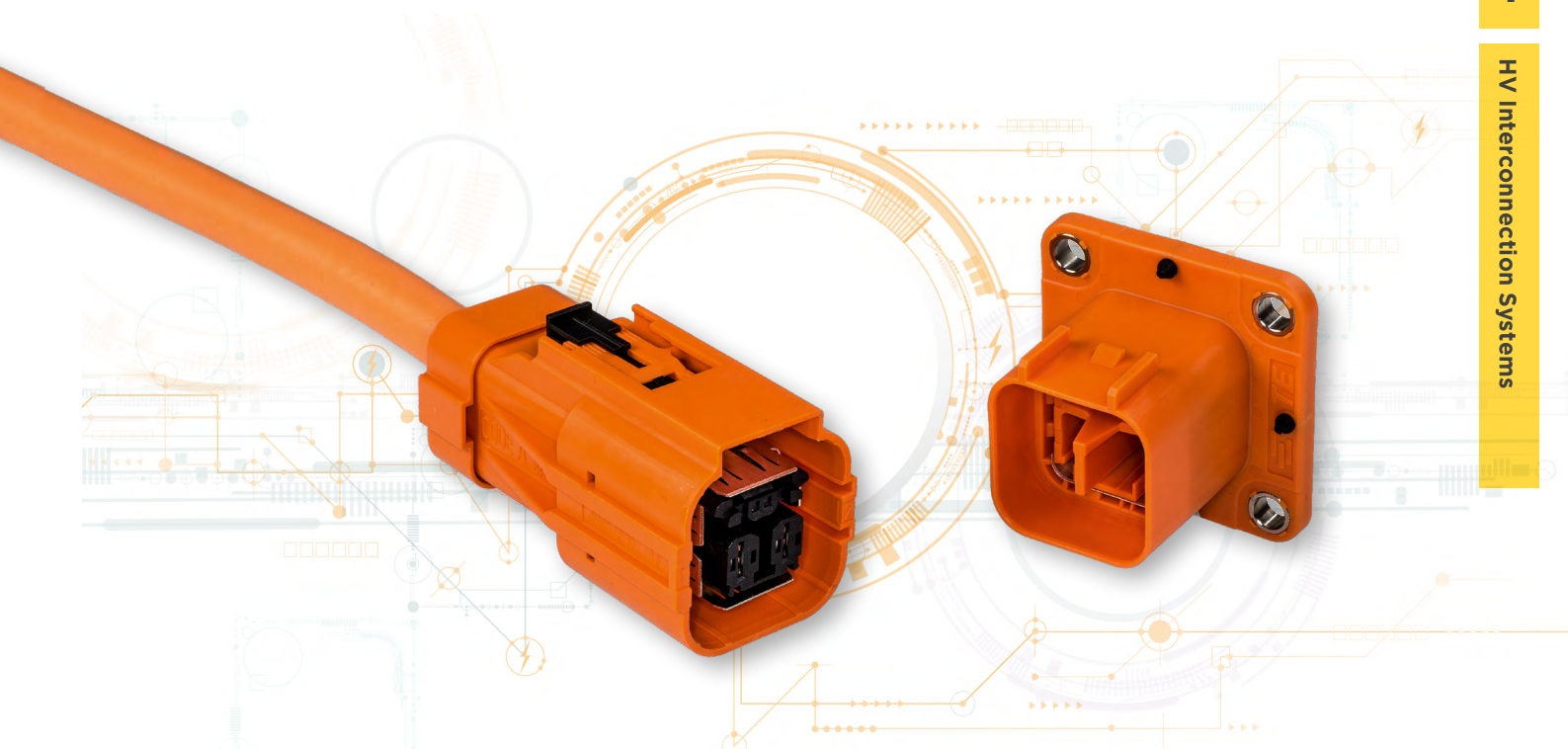


Drawing 2330222 \*



\* Drawing number is NOT the order number!





## AMP+ HVA 630 HV INTERCONNECTION SYSTEM INTRODUCTION

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

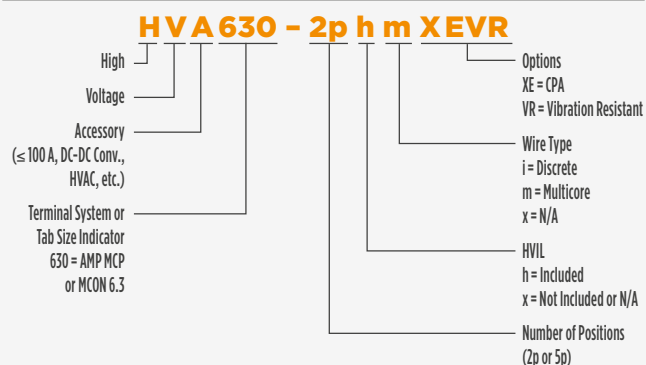
High-voltage applications typically require sealed and shielded two-pole DC connectors and headers.

At its core the AMP+ HVA 630 interconnection system features our proven AMP MCP 6.3 terminal. The shielded multi-core wire is designed for conductor cross-sections from 2.5 up to 6.0 mm<sup>2</sup>. This allows currents of 40 A at 140°C ambient temperature and voltages of up to 850 VDC.

Typical applications for HVA 630 HV interconnection systems include: DC/DC converter, HV heater, HV climate compressor and on-board charger.

### Naming Convention

#### HVA 630 Interconnection System





### Applications

- DC / DC Converter
- HV Heater
- HV Climate Compressor
- On-Board Charger

### Technical Features

#### Poles:

2

#### Terminal Size / System:

AMP MCP 6.3

#### Conductor Cross-Sections:

4.0 mm<sup>2</sup> to 6.0 mm<sup>2</sup>

#### Wire Type:

Multi-core

#### Voltage Rating:

850 VDC

#### Temperature Range:

-40°C up to 140°C

#### Current Carrying Capability:

56 A at 85°C (6 mm<sup>2</sup>)

#### IP Rating, Mated:

IP6K7, IP6K9K

#### IP Rating, Unmated:

IP2XB

#### HV Interlock Option:

Bridged in the connector

#### Latch Access Type:

Tool accessible

#### CPA:

Yes

#### Vibration Level:

SG 2 (LV 215-1)

#### Shielding / Options:

Yes

#### EMC Shielding Resistance:

10 mΩ

#### Available Codings:

A, F

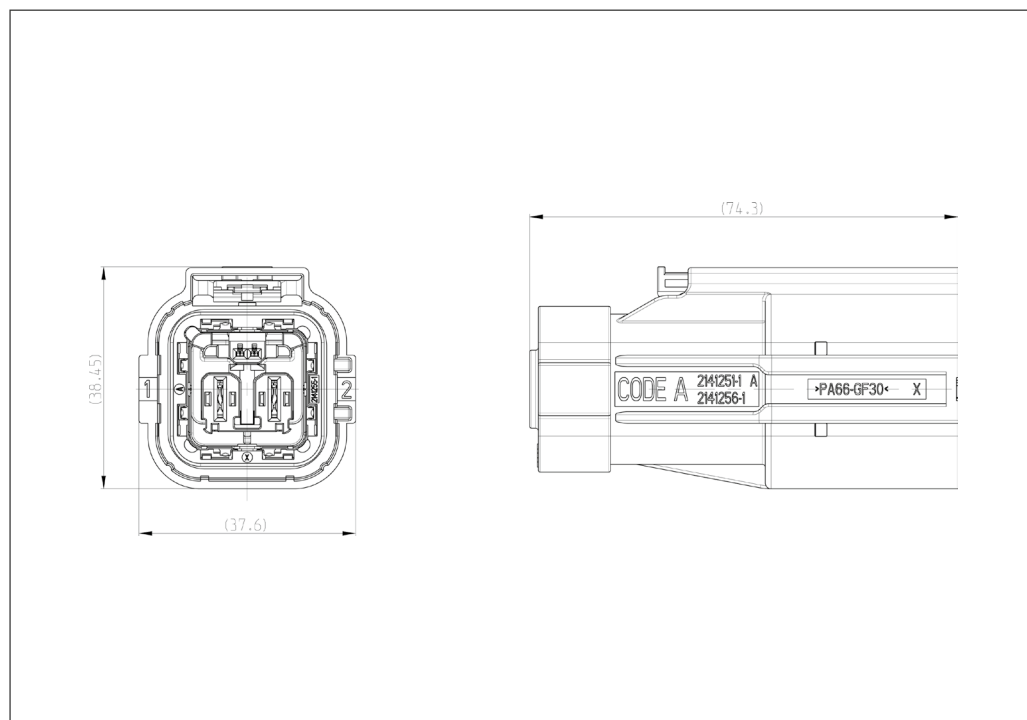
#### Product Specification:

108-94264

#### Application Specification:

114-94100

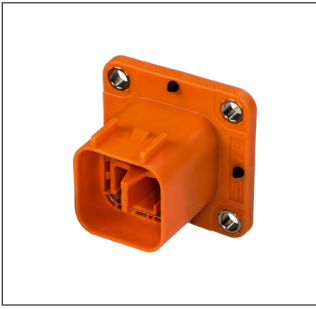
## AMP+ HVA 630 2p hm - Plug



Drawing 114-94100-1 \*

| Version<br>(Cable Dimension)                                                                                                                                                                                                         | Coding | With CPA | Order Information             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------|-------------------------------|
| 2.0 x 4.0 mm <sup>2</sup><br>released                                                                                                                                                                                                | A      | ✓        | To be ordered<br>see drawing! |
|                                                                                                                                                                                                                                      | F      | ✓        |                               |
| 2.0 x 6.0 mm <sup>2</sup><br>released                                                                                                                                                                                                | A      | ✓        |                               |
| Intelligent Plug                                                                                                                                                                                                                     |        |          | Order Information             |
| The HVA 630 Intelligent Plug is an high voltage connector, which acts as a 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. |        |          | To be ordered<br>see drawing! |

\* Drawing number is NOT the order number!



### Applications

- DC / DC Converter
- HV Heater
- HV Climate Compressor
- On-Board Charger

### Technical Features

**Poles:**  
2

**Tab Size:**  
6.3 mm

**Wire Type:**  
Single-core

**Voltage Rating:**  
850 VDC

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

**Current Carrying Capability:**  
56 A at 85°C (6 mm<sup>2</sup>)

**IP Rating, Mated:**  
IP6K7, IP6K9K

**IP Rating, Unmated:**  
IP2XB

**HV Interlock Option:**  
Bridged in the connector

**Vibration Level:**  
SG 2 (LV 215-1)

**Shielding / Options:**  
Yes

**EMC Shielding Resistance:**  
10 mΩ

**Available Codings:**  
A, F

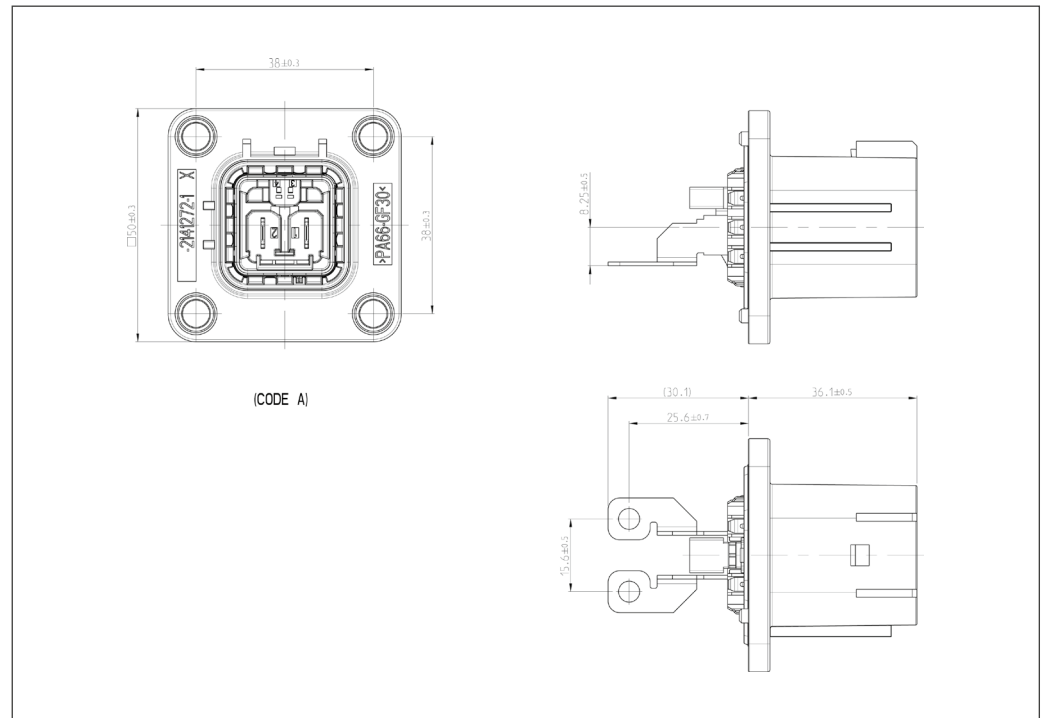
**Product Specification:**  
108-94264

**Application Specification:**  
114-94100

**Interface Drawing:**  
114-94036

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

### AMP+ HVA 630 2p hi - Header

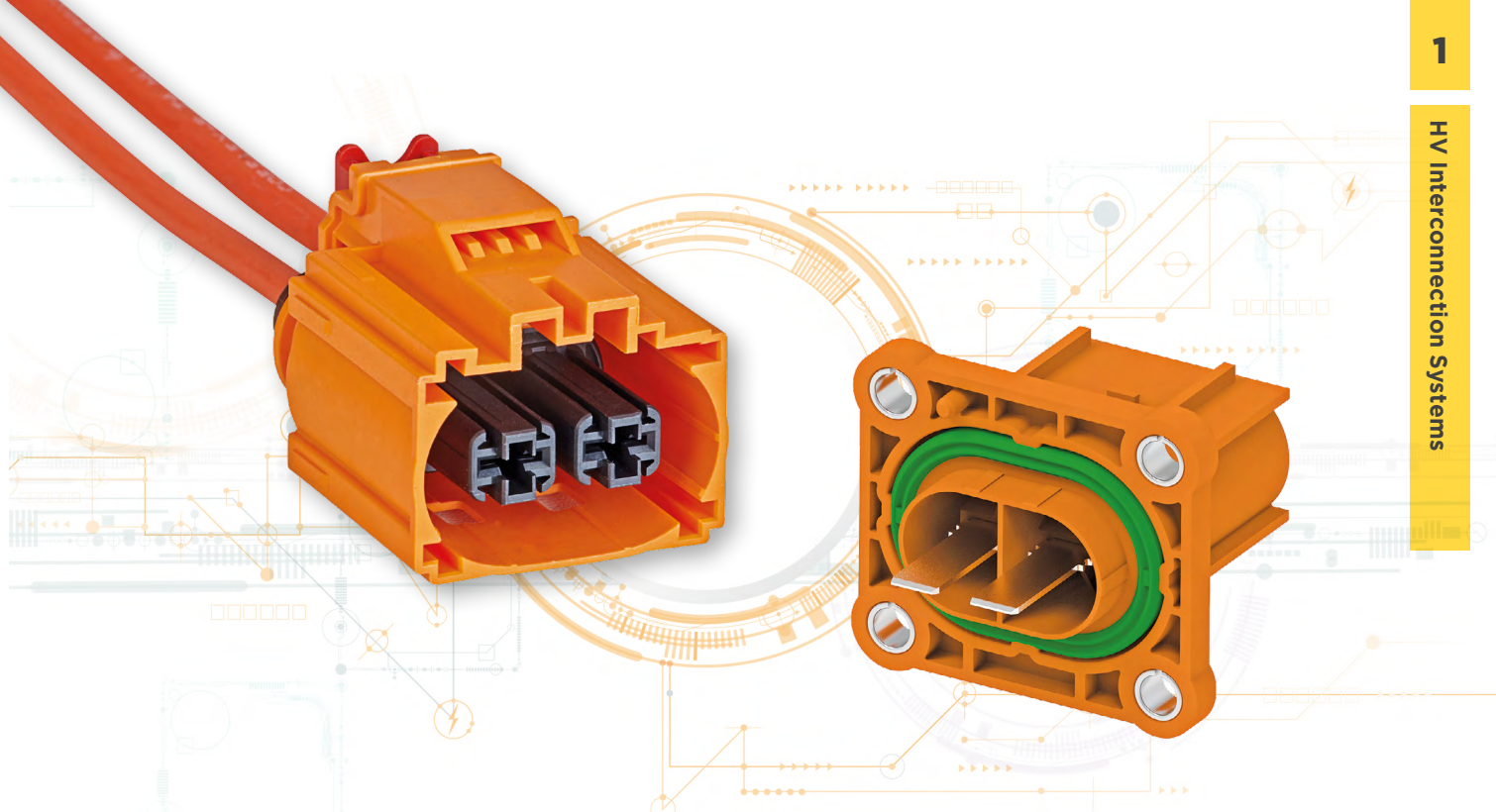


Drawing 2141272 \*

|                     | Coding | Order Information             |
|---------------------|--------|-------------------------------|
| HVA 630 - 2p Header | A      | To be ordered<br>see drawing! |
|                     | F      |                               |

\* Drawing number is NOT the order number!





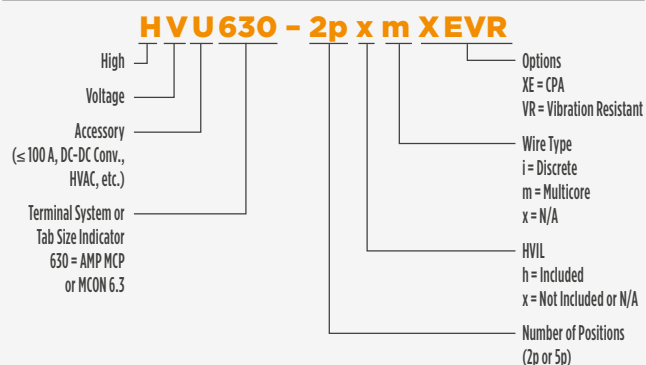
## AMP+ HVU 630 2P HV INTERCONNECTION SYSTEM INTRODUCTION

The AMP+ HVU 630 two-pole connector for unshielded applications allows for a current of up to 45 A (at 85°C) for 4 mm<sup>2</sup> cables and achieves vibration class LV 215 for severity level 3. The system is capable of handling voltage levels up to 1,000 VDC.

The connector system features a tool activated latching mechanism with optimized packaging size and routing flexibility. In addition it provides finger protection according to UL standard. For the header V0 flame resistant isolation material was used.

The HVU 630-2p connector can be applied on DC/DC converter, on-board charger, HV electric heater and electric climate compressor.

### Naming Convention HVU 630 Interconnection System







### Applications

- DC / DC Converter
- HV Heater
- HV Climate Compressor
- On-Board Charger

### Technical Features

#### Poles:

2

#### Terminal Size / System:

AMP MCP 6.3

#### Conductor Cross-Sections:

4 mm<sup>2</sup>

#### Voltage Rating:

1,000 VDC

#### Temperature Range:

-40°C up to 140°C

#### Current Carrying Capability:

45 A at 85°C (4 mm<sup>2</sup>)

#### IP Rating, Mated:

IP67, IP6K9K, ISO 20653: IP2XD

#### IP Rating, Unmated:

IPXXB+ (UL finger + 2 mm / 30 N)

#### Latch Access Type:

Tool accessible

#### CPA:

Yes

#### Fire Classification:

HB

#### Vibration Level:

SG 3 (LV 215-1)

#### Shielding / Options:

N/A

#### EMC Shielding Resistance:

N/A

#### Available Codings:

A (optional: B, C, D)

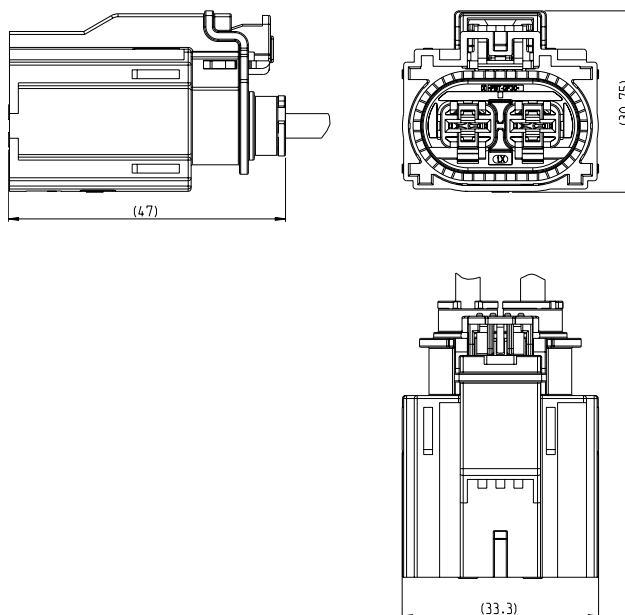
#### Product Specification:

108-94680

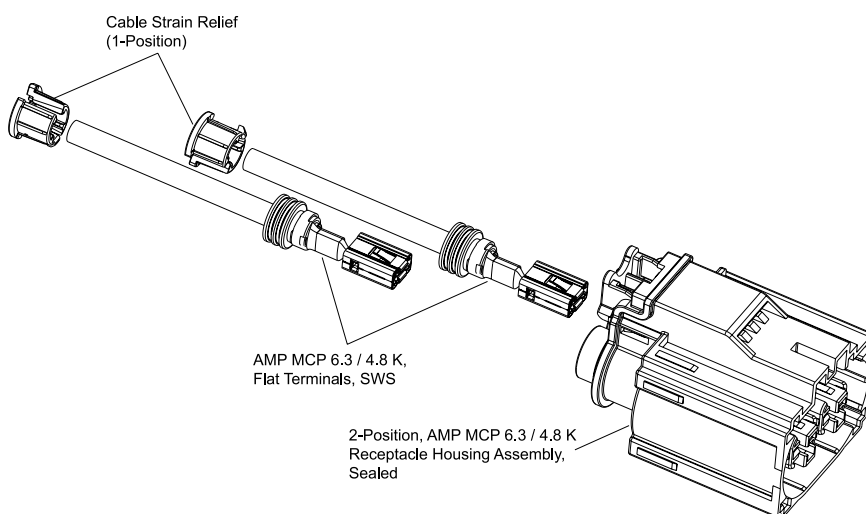
#### Application Specification:

114-94552

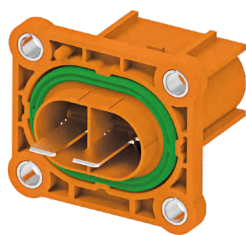
## AMP+ HVU 630 2p xi XEVR – Plug



Drawing 2319388 \*



\* Drawing number is NOT the order number!



### Applications

- DC / DC Converter
- HV Heater
- HV Climate Compressor
- On-Board Charger

### Technical Features

#### Poles:

2

#### Tab Size:

6.3 mm

#### Voltage Rating:

1,000 VDC

#### Temperature Range:

-40°C up to 140°C

#### Current Carrying Capability:

45 A at 85°C (4 mm<sup>2</sup>)

#### IP Rating, Mated:

IP67, IP6K9K, ISO 20653: IP2XD

#### IP Rating, Unmated:

UL2231-2 (finger) + 2 mm / 30 N

#### Latch Access Type:

N/A

#### Fire Classification:

V0 for header housing

#### Vibration Level:

SG 3 (LV 215-1)

#### Shielding / Options:

N/A

#### EMC Shielding Resistance:

N/A

#### Available Codings:

A, B, D, E, F

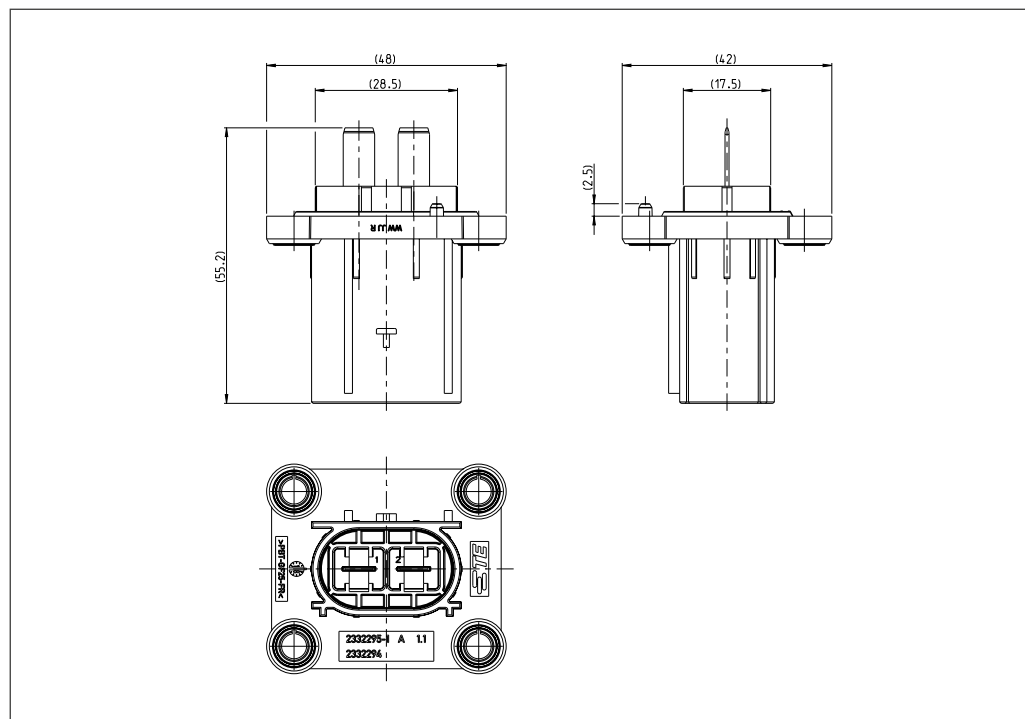
#### Product Specification:

108-94680

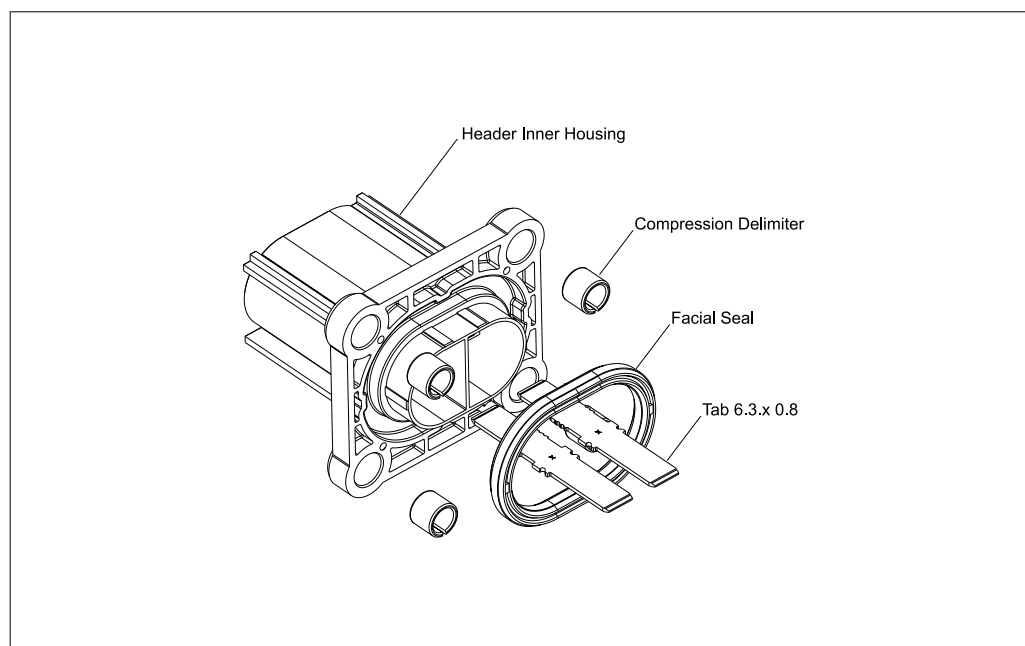
#### Application Specification:

114-94552

## AMP+ HVU 630 2p xi - Header



Drawing 2332294 \*



\* Drawing number is NOT the order number!





## AMP+ HVA 630 5P HV INTERCONNECTION SYSTEM INTRODUCTION

The AMP+ HVA 630 five-pole connector system allows for a three-phase charging current of 32 A and meets the relevant IEC 62196-2 type 2 standard for a maximum charging capacity of 22 kW.

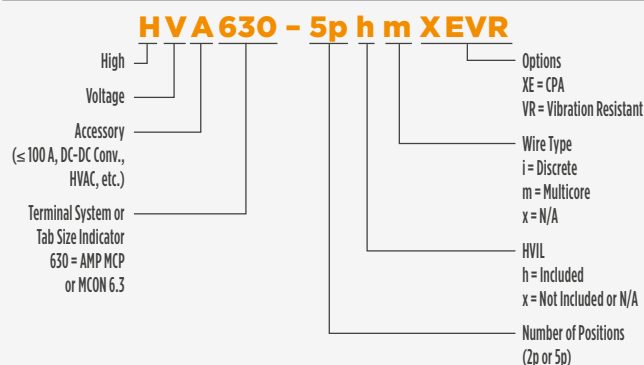
The increasing battery capacity of plug-in hybrid and electric vehicles requires a higher amount of charging power to enable faster charging times.

Our AMP+ HVA 630 5p interconnection system provides finger protection and is designed for multi-shielded 360°, includes High Voltage Interlock functionality and is based on synthetic material meeting VO flammability requirements.

Due to its lever control, the necessary mating forces is less than 70 N.

### Naming Convention

#### HVA 630 Interconnection System





### Applications

- DC / DC Converter
- HV Heater
- HV Climate Compressor
- On-Board Charger

### Technical Features

#### Poles:

5

#### Terminal Size / System:

AMP MCP 6.3

#### Conductor Cross-Sections:

4.0 mm<sup>2</sup> and 6.0 mm<sup>2</sup>

#### Voltage Rating:

850 VDC

#### Temperature Range:

-40°C up to 140°C

#### Current Carrying Capability:

50 A at 85°C (6 mm<sup>2</sup>)

#### IP Rating, Mated:

IP6K7, IP6K9K

#### IP Rating, Unmated:

IP2XB

#### HV Interlock Option:

Bridged in the connector

#### CPA:

Yes

#### Fire Classification:

HB

#### Vibration Level:

SG 2 (LV215-1)

#### Shielding / Options:

Yes

#### EMC Shielding Resistance:

10 mΩ

#### Available Codings:

A

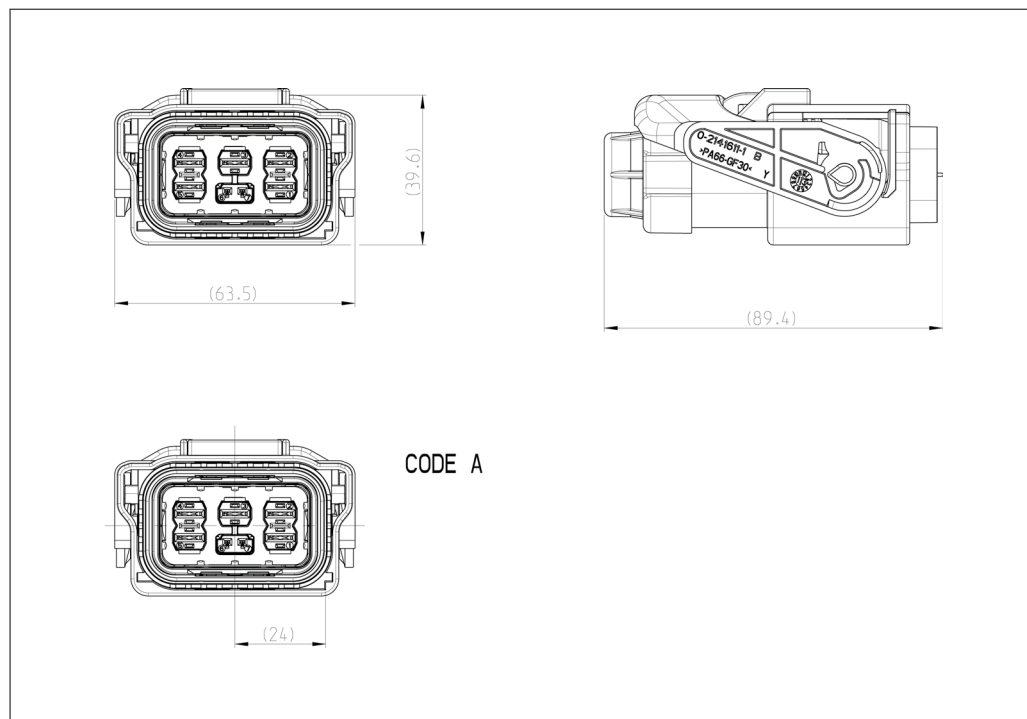
#### Product Specification:

108-94235

#### Application Specification:

114-94114

## AMP+ HVA 630 5p hm - Plug



Drawing 114-94114-1 \*

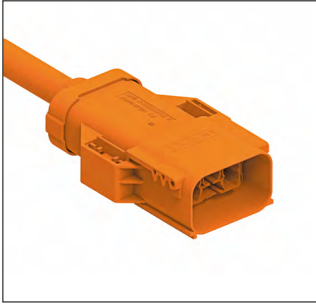
| Version<br>(Cable Dimension) |             | Coding | With CPA | Without CPA | Order Information             |
|------------------------------|-------------|--------|----------|-------------|-------------------------------|
| 5.0 x 6.0 mm <sup>2</sup>    | released    | A      | ✓        | ✓           | To be ordered<br>see drawing! |
| 4.0 x 4.0 mm <sup>2</sup>    | released    | A      | ✓        | ✓           |                               |
| 3.0 x 4.0 mm <sup>2</sup>    | released    | A      | ✓        | ✓           |                               |
| 3.0 x 6.0 mm <sup>2</sup>    | in planning | A      |          |             |                               |
| 4.0 x 6.0 mm <sup>2</sup>    |             | A      |          |             |                               |

\* Drawing number is NOT the order number!









### Applications

- DC / DC Converter
- HV Heater
- HV Climate Compressor
- On-Board Charger

### Technical Features

#### Poles:

5

#### Terminal Size / System:

AMP MCP 6.3

#### Conductor Cross-Sections:

4.0 mm<sup>2</sup> and 6.0 mm<sup>2</sup>

#### Wire Type:

Multi-core

#### Voltage Rating:

850 VDC

#### Temperature Range:

-40°C up to 140°C

#### Current Carrying Capability:

50 A at 85°C (6 mm<sup>2</sup>)

#### IP Rating, Mated:

IP6K7, IP6K9K

#### IP Rating, Unmated:

IP2XB

#### HV Interlock Option:

N/A

#### Vibration Level:

SG 2 (LV 215-1)

#### Shielding / Options:

Yes

#### EMC Shielding Resistance:

10 mΩ

#### Available Codings:

A

#### Product Specification:

not available yet

#### Application Specification:

114-94502

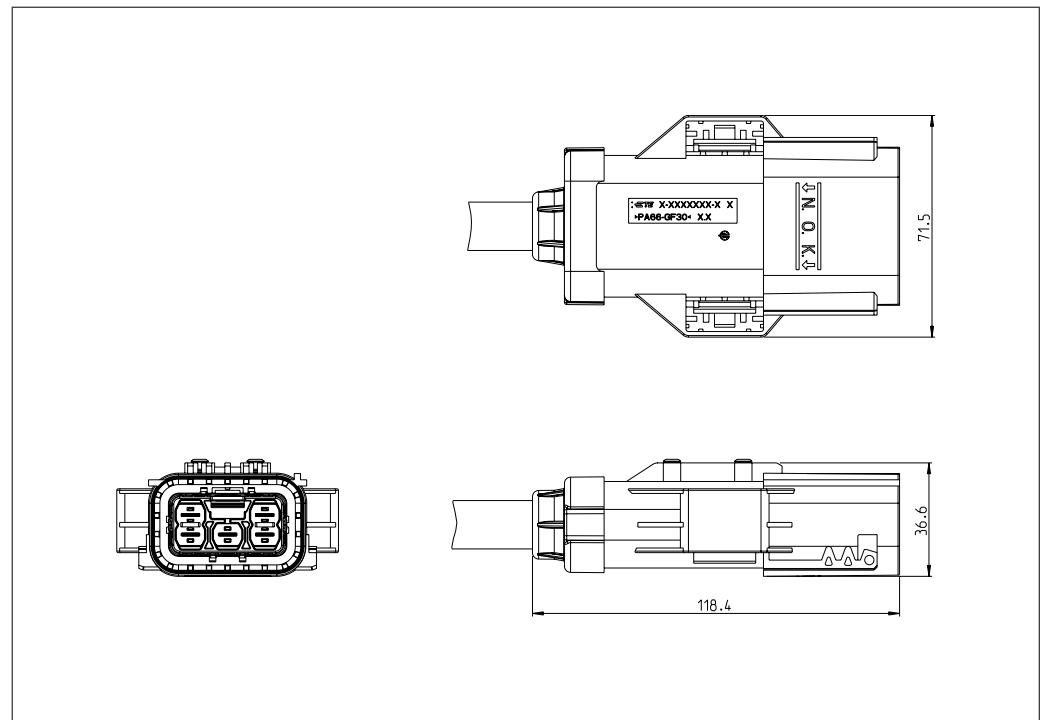
#### Interface Drawing:

114-94099

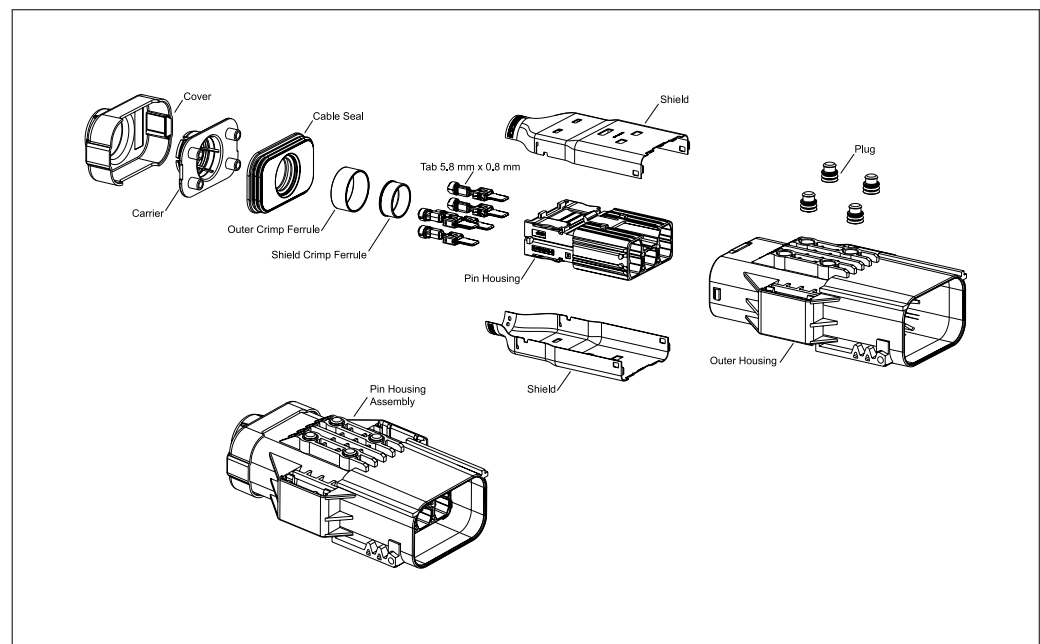
#### Interface Drawing Adapter Plate:

N/A

## AMP+ HVA 630 5p xm - Inline Cap

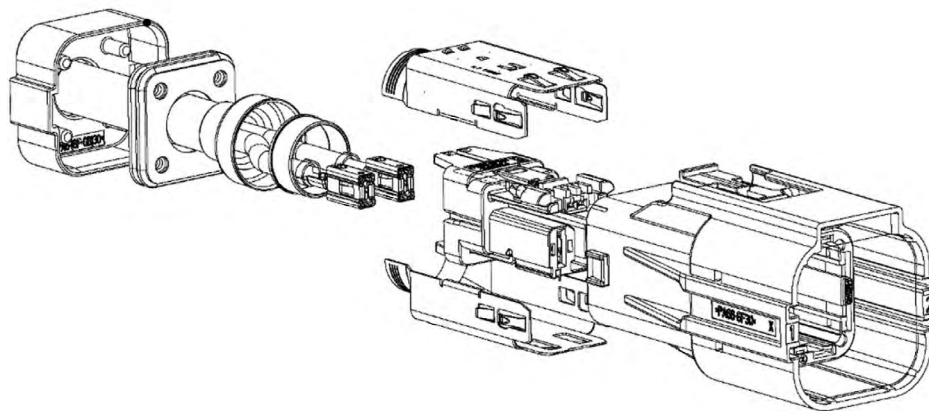


Drawing 2318819 \*, 2318821 \*, 2318822 \*



\* Drawing number is NOT the order number!

## AMP+ HVA 630 Connector System Kits

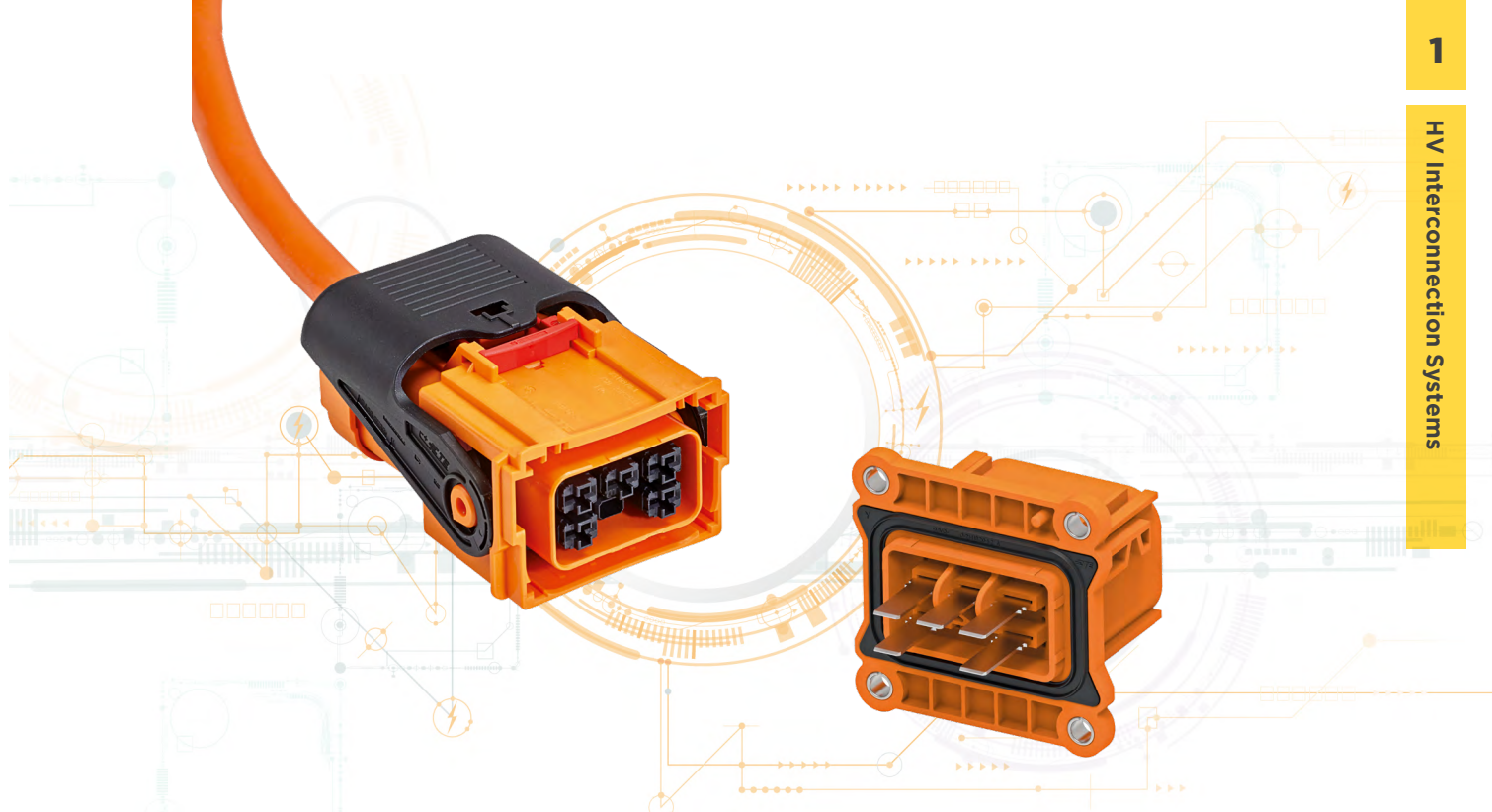


Example: Kit Number YHVA630-2phm-4mm-A

## AMP+ HVA 630 Connector System Kits \*)

| Connector | Position | Cable<br>(mm <sup>2</sup> ) | Key | LADD Connector Kit<br>Number | Mating Header<br>Part Number          | LADD Header Kit<br>Number |
|-----------|----------|-----------------------------|-----|------------------------------|---------------------------------------|---------------------------|
| HVA 630   | 2        | 4                           | A   | YHVA630-2phm-4mm-A           | 90°: 1-2141272-1<br>180°: 2-2141272-1 | 90°: YHVA630-2phi-hdr-A   |
|           |          | 6                           | A   | YHVA630-2phm-6mm-A           | 90°: 1-2141272-1<br>180°: 2-2141272-1 | 90°: YHVA630-2phi-hdr-A   |
|           | 3        | 4                           | A   | YHVA630-3phm-4mm-A           | 90°: 2141619-1<br>180°: 2236454-1     | -                         |
|           | 4        | 4                           | A   | YHVA630-4phm-4mm-A           | 90°: 2141619-1<br>180°: 2236454-1     | -                         |
|           | 5        | 6                           | A   | YHVA630-5phm-6mm-A           | 90°: 2141619-1<br>180°: 2236454-1     | -                         |
|           |          |                             |     |                              | 90°: 2141619-1                        |                           |
|           |          |                             |     |                              | 180°: 2236454-1                       |                           |
|           |          |                             |     |                              | 90°: 2141619-1                        |                           |

\*) Kits include HVIL terminals



## AMP+ HVU 630 5P HV UNSHIELDED INTERCONNECTION SYSTEM INTRODUCTION

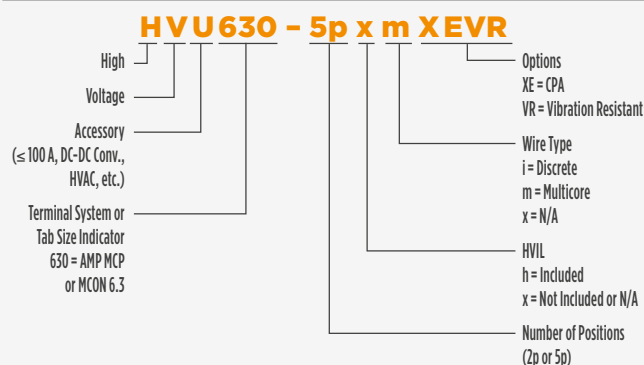
Our AMP+ HVU five-pole connector system for unshielded charging applications allows for a current of up to 60 A (at 85°C) for 6 mm<sup>2</sup> cables and achieves vibration class LV 215 for severity level 3. The system is capable of handling voltage levels up to 1,000 VDC.

The connector system has a tool activated or finger activated latching mechanism with optimized packaging size and routing flexibility. In addition it provides finger protection according to UL standard. The header features VO flame resistant isolation material.

The HVU 630 5p connector is specifically designed for on-board charger applications.

### Naming Convention

#### HVU 630 Interconnection System (5p)





### Applications

- On-Board Charger

### Technical Features

#### Poles:

5

#### Terminal Size / System:

AMP MCP 6.3

#### Conductor Cross Section:

4 mm<sup>2</sup> to 6 mm<sup>2</sup>

#### Voltage Rating:

1,000 VDC

#### Temperature Range:

-40°C up to 140°C

#### Current Carrying Capability:

50 A at 85°C (6 mm<sup>2</sup>)

#### IP Rating, Mated:

IP6K7, IP6K9K

#### IP Rating, Unmated:

UL2231-2 (finger) + 2 mm / 30 N

#### HV Interlock Option:

Bridged in the connector

#### CPA:

Yes

#### Vibration Level:

SG 3 (LV 215-1)

#### Shielding / Options:

N/A

#### EMC Shielding Resistance:

N/A

#### Available Codings:

A

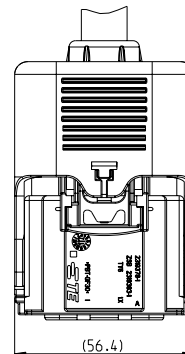
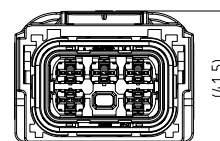
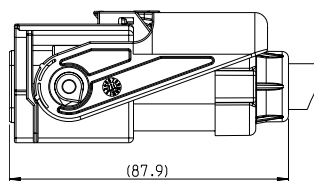
#### Product Specification:

108-94681

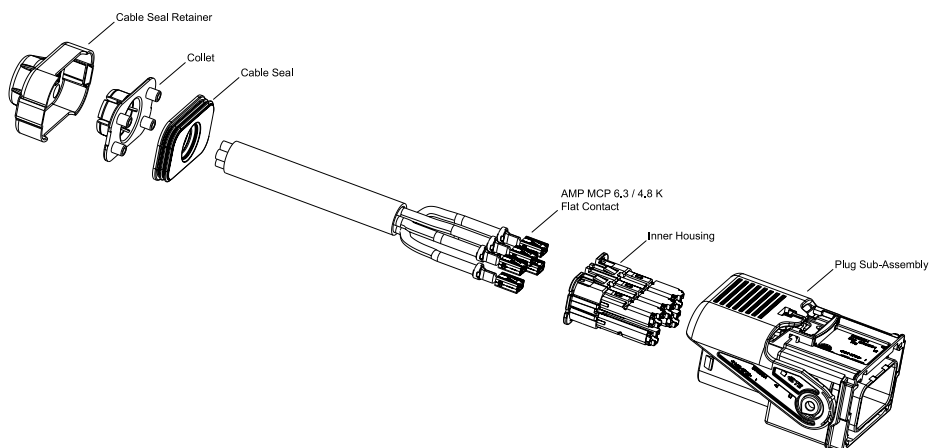
#### Application Specification:

114-94552

## AMP+ HVU 630 5p xm XEVR – Plug



Drawing 2319386 \*



\* Drawing number is NOT the order number!



### Applications

- On-Board Charger

### Technical Features

**Poles:**

5

**Tab Size:**

6.3 mm

**Voltage Rating:**

1,000 VDC

**Temperature Range:**

-40°C up to 140°C

**Current Carrying Capability:**

60 A at 85°C (6 mm<sup>2</sup>)

**IP Rating, Mated:**

IP67, IP6K9K, ISO 20653: IP2XD

**IP Rating, Unmated:**

UL2231-2 (finger) + 2 mm / 30 N

**HV Interlock Option:**

Bridged in the connector

**Latch Access Type:**

N/A

**Fire Classification:**

V0 for Header Housing

**Vibration Level:**

SG 3 (LV 215-1)

**Shielding / Options:**

N/A

**EMC Shielding Resistance:**

N/A

**Available Codings:**

A, B, D, E, F

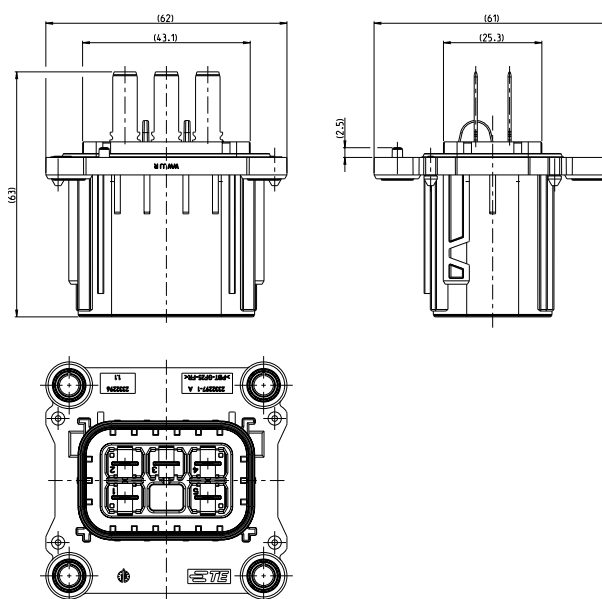
**Product Specification:**

108-94681

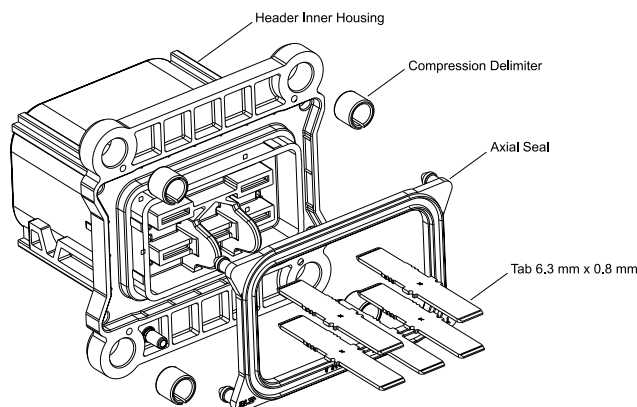
**Application Specification:**

114-94552

## AMP+ HVU 630 5p xi - Header



Drawing 2332296 \*



\* Drawing number is NOT the order number!



### Applications

- On-Board Charger

### Technical Features

#### Poles:

5

#### Terminal Size / System:

AMP MCP 6.3

#### Conductor Cross-Sections:

6.0 mm<sup>2</sup> + 0.5 mm<sup>2</sup>

#### Wire Type:

Single-core

#### Voltage Rating:

850 VDC

#### Temperature Range:

-40°C up to 140°C

#### Current Carrying Capability:

40 A at 85°C

#### IP Rating, Mated:

IP67, IP6K9K, ISO 20653: IP2XD

#### IP Rating, Unmated:

ISO 20653: IP2XB

(as existing 114-94114-1)

#### HV Interlock Option:

Integrated, internal

#### Latch Access Type:

Finger

#### CPA:

Yes

#### Fire Classification:

HB

#### Vibration Level:

SG 3 (LV 215-1)

#### Shielding / Options:

N/A

#### EMC Shielding Resistance:

N/A

#### Available Codings:

A

#### Product Specification:

108-94235

#### Application Specification:

114-20233

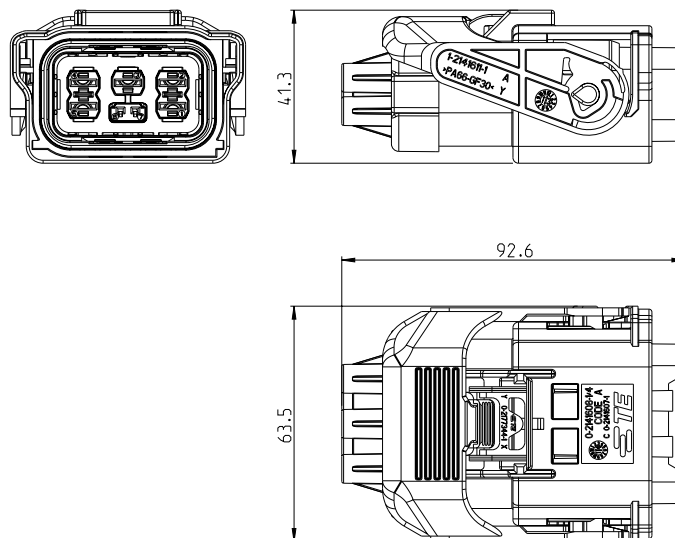
#### Interface Drawing:

114-94099

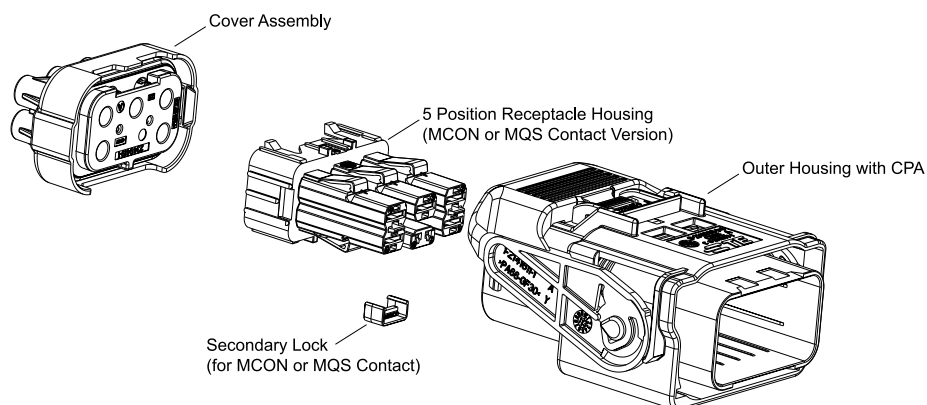
#### Interface Drawing Adapter Plate:

114-94279

## AMP+ HVU 630 5p hi XE - Plug



Drawing 2349364 \*



\* Drawing number is NOT the order number!



## Applications

- On-Board Charger

## Technical Features

**Poles:**  
5

**Terminal Size / System:**  
AMP MCP 6.3

**Tab Size:**  
6.3 mm x 0.8 mm

**Voltage Rating:**  
850 VDC

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

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

**IP Rating, Mated:**  
IP6K7, IP6K9K

**IP Rating, Unmated:**  
IP2XB

**Fire Classification:**  
V0

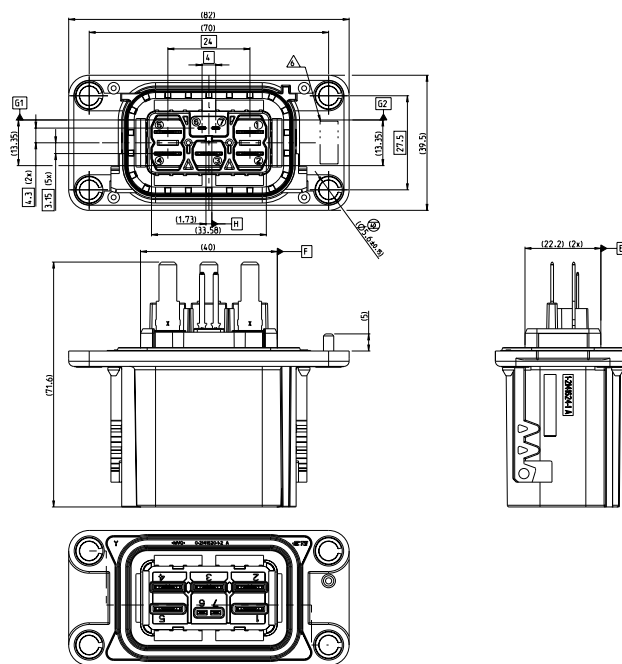
**Vibration Level:**  
SG 3 (LV 215-1)

**Shielding / Options:**  
N/A

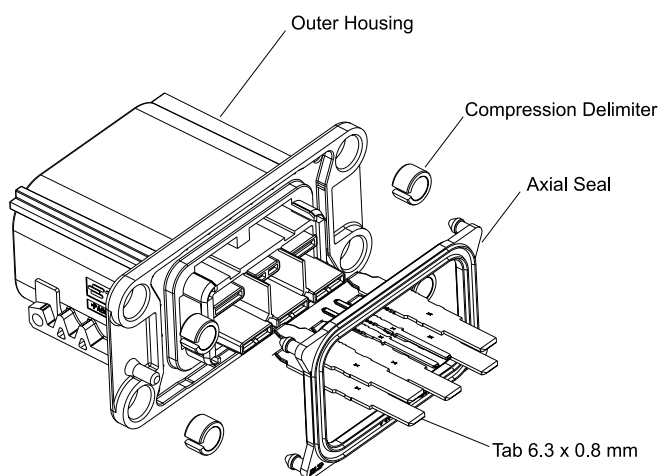
**EMC Shielding Resistance:**  
N/A

**Available Codings:**  
A

**AMP+ HVU 630 5p hi – Header**



Drawing 2349367 \*



\* Drawing number is NOT the order number!





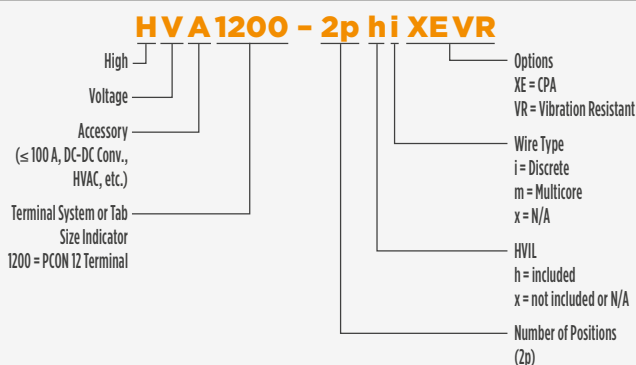
## AMP+ HVA 1200 HV INTERCONNECTION SYSTEM INTRODUCTION

The AMP+ HVA 1200 HV interconnection system features a voltage rating of up to 1,000 VDC and a current carrying capability of 100 A at 85°C. It is specifically designed to ensure a safe and reliable connection between the on-board charger, the charging inlet, the battery, the inverter and the e-motor.

The system features a header and two plugs for both straight and right angle connector applications. At its core a newly designed PCON 12 high-power terminal (see page 12) supports a total wire range from 5.0 to 16.0 mm<sup>2</sup> respectively 10.0 to 16.0 mm<sup>2</sup> according to LV 216-2.

For maximum flexibility the single header can be mated with 90° as well as 180° plugs. In addition, the system features an integrated HV interlock completed by the critical built-in touch-safety according to IEC60529 IPXXB and UL-finger standards.

### Naming Convention HVA 1200 Interconnection System





## Applications

- On-Board Charger
- Inverter
- HV Battery
- E-Motor

## Technical Features

**Poles:**  
2

**Terminal Size / System:**  
PCON 12

**Conductor Cross-Sections:**  
5 mm<sup>2</sup> to 16 mm<sup>2</sup>

**Wire Type:**  
Single-core

**Voltage Rating:**  
1,000 VDC

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

**Current Carrying Capability:**  
100 A at 85° (16 mm<sup>2</sup>)

**IP Rating, Mated:**  
IP6K7, IP6K9K

**IP Rating, Unmated:**  
IPXXB+ (UL Finger)

**HV Interlock Option:**  
Bridged in the connector

**CPA:**  
Yes

**Fire Classification:**  
V0

**Vibration Level:**  
SG 2 (LV 215-1)

**Shielding / Options:**  
Yes

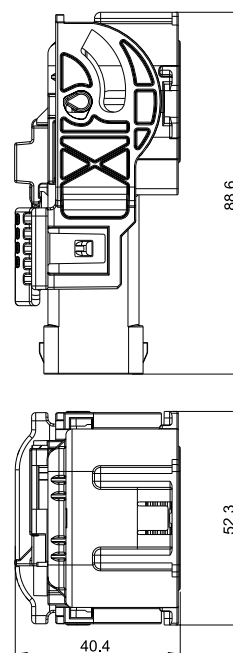
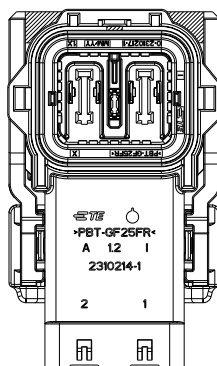
**EMC Shielding Resistance:**  
10 mΩ

**Available Codings:**  
A, B, C

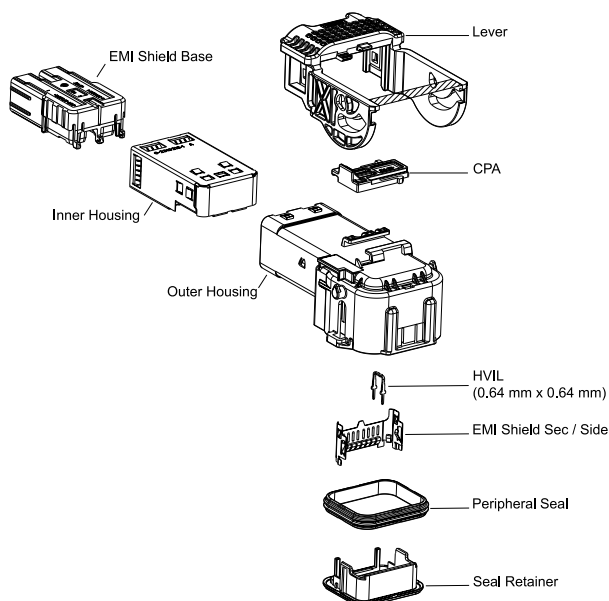
**Product Specification:**  
108-94749

**Application Specification:**  
114-94518

### AMP+ HVA 1200 2p hi XE - Plug 90°



Drawing 2310213 \*



\* Drawing number is NOT the order number!



### Applications

- On-Board Charger
- Inverter
- HV Battery
- E-Motor

### Technical Features

**Poles:**

2

**Terminal Size / System:**

PCON 12

**Conductor Cross-Sections:**

5 mm<sup>2</sup> to 16 mm<sup>2</sup>

**Voltage Rating:**

1,000 VDC

**Temperature Range:**

-40°C up to 140°C

**Current Carrying Capability:**

100 A at 85°C (16 mm<sup>2</sup>)

**IP Rating, Mated:**

IP6K7, IP6K9K

**IP Rating, Unmated:**

IPXXB+ (UL Finger)

**HV Interlock Option:**

Bridged in the connector

**CPA:**

Yes

**Fire Classification:**

V0

**Vibration Level:**

SG 2 (LV 215-1)

**Shielding / Options:**

Yes

**EMC Shielding Resistance:**

10 mΩ

**Available Codings:**

A, B, C

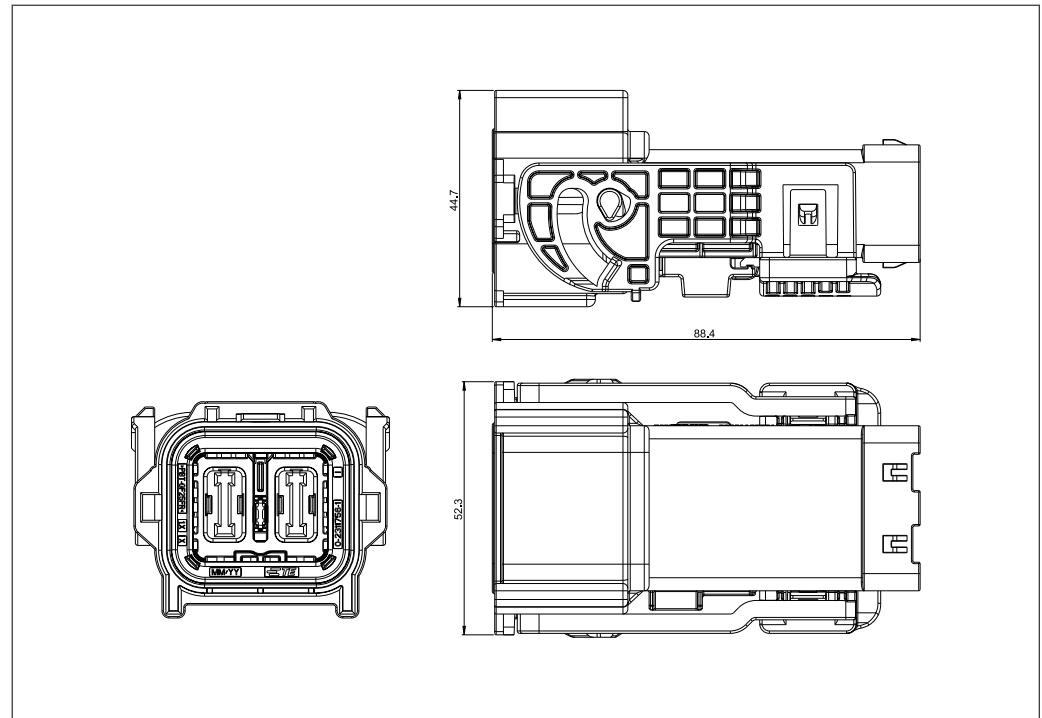
**Product Specification:**

108-94749

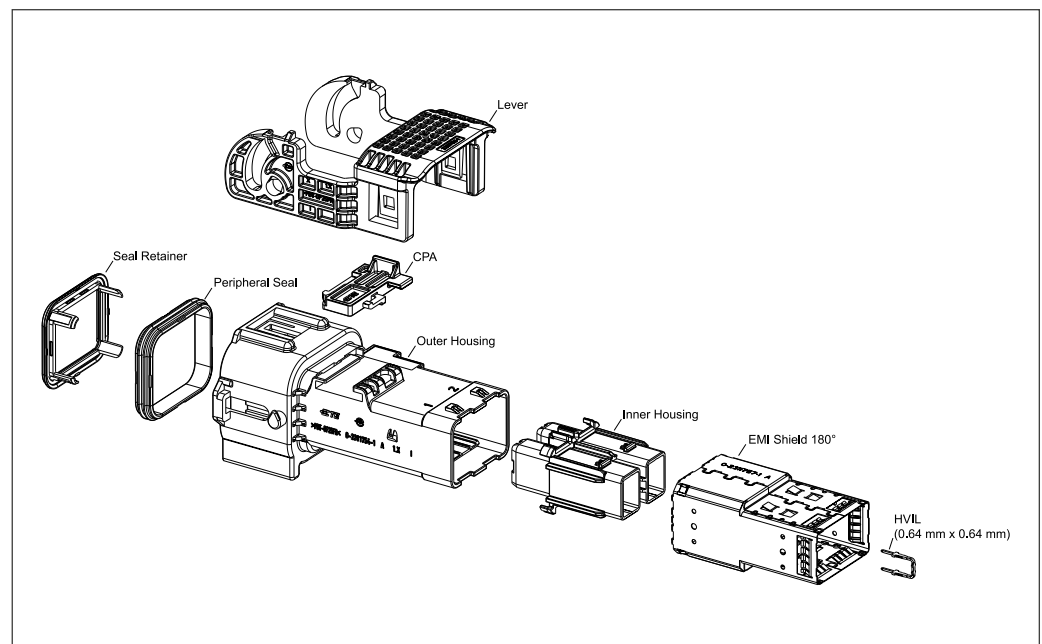
**Application Specification:**

114-94518

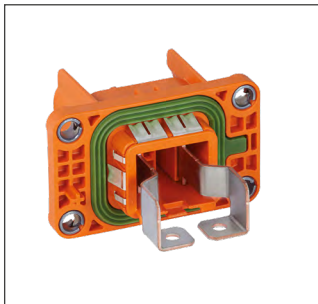
## AMP+ HVA 1200 2p hi XE - Plug 180°



Drawing 2311753 \*



\* Drawing number is NOT the order number!



### Applications

- On-Board Charger
- Inverter
- HV Battery
- E-Motor

### Technical Features

#### Poles:

2

#### Terminal Size / System:

PCON 12

#### Tab Size:

12 mm incl. finger protection

#### Voltage Rating:

1,000 VDC

#### Temperature Range:

-40°C up to 140°C

#### Current Carrying Capability:

120 A at 65°C

#### IP Rating, Mated:

IP6K7, IP6K9K

#### IP Rating, Unmated:

IPXXB+ (UL Finger)

#### HV Interlock Option:

Bridged in the connector

#### Fire Classification:

V0

#### Vibration Level:

SG 2 (LV 215-1)

#### Shielding / Options:

Yes

#### EMC Shielding Resistance:

10 mΩ

#### Available Codings:

A, B, C

#### Product Specification:

108-94749

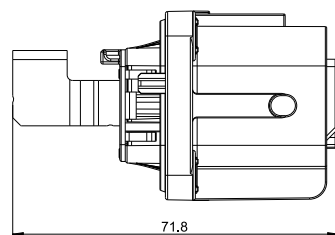
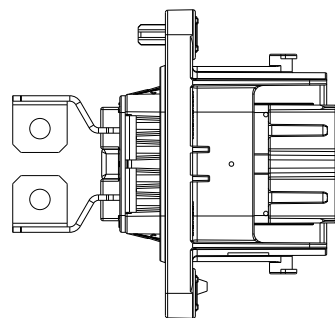
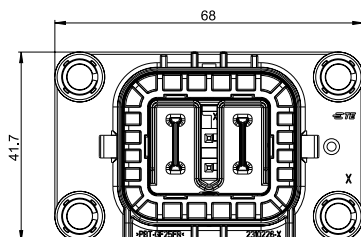
#### Application Specification:

114-94515

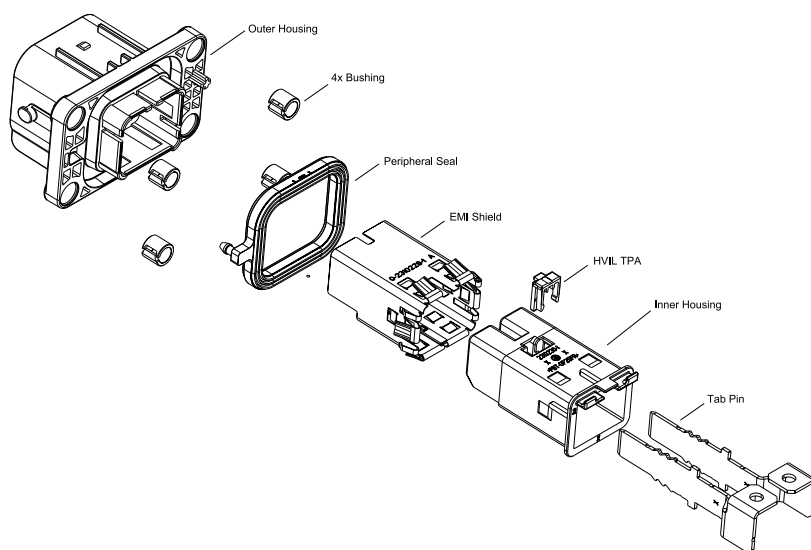
#### Interface Drawing Adapter Plate:

208-18103

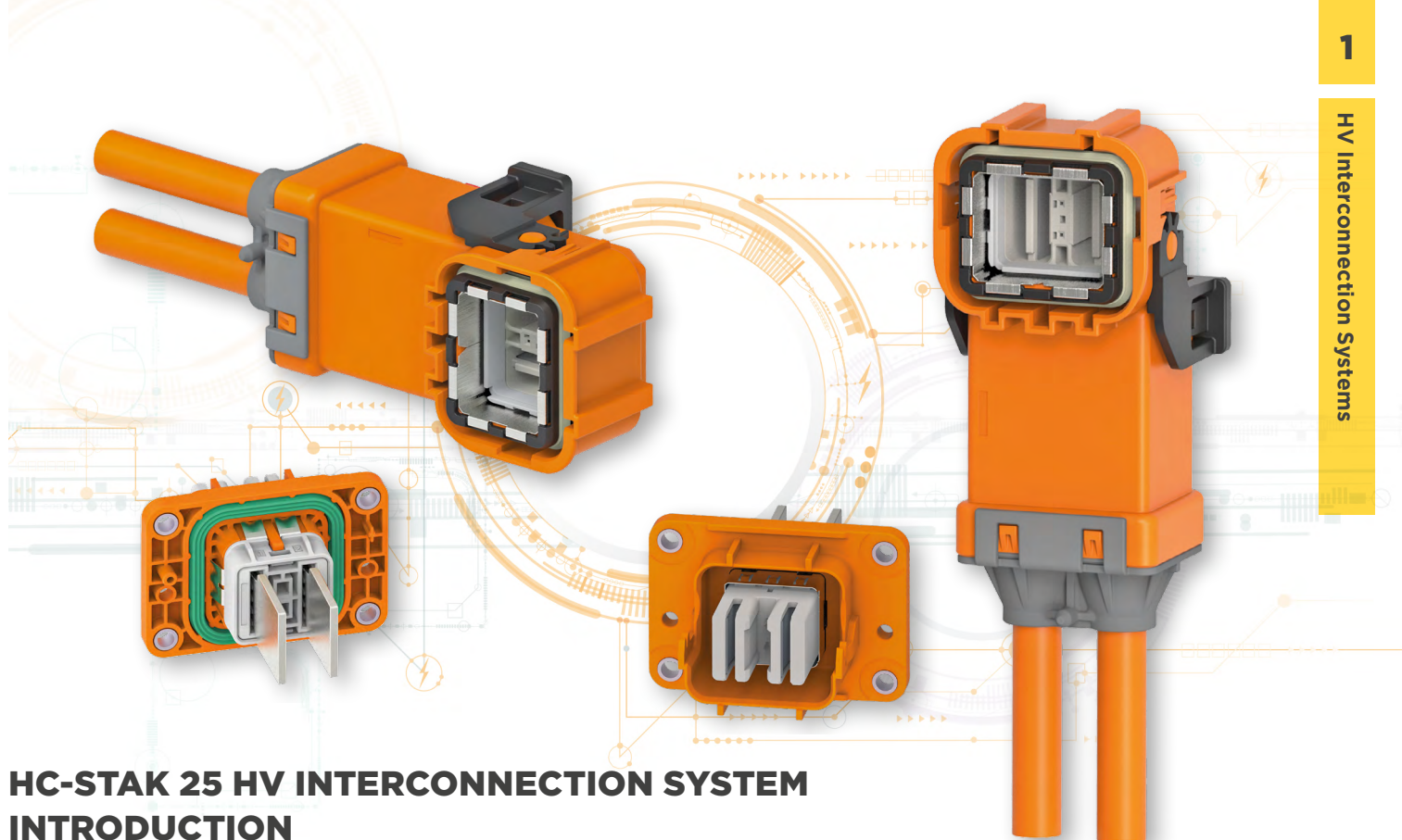
## AMP+ HVA 1200 2p hi - Header



Drawing 2310224 \*



\* Drawing number is NOT the order number!



## HC-STAK 25 HV INTERCONNECTION SYSTEM INTRODUCTION

With a voltage rating of up to 1,000 VDC and a current carrying capability of up to 257 A at 85°C (50 mm<sup>2</sup>) the HC-STAK 25 HV interconnection system is specifically designed to provide a safer and reliable connection between the HV battery and the inverter or the power distribution and e-motor.

The HC-STAK 25 HV interconnection system features a high performance interconnection system that is both scalable and capable of reliable high-power distribution to each aggregate throughout the lifetime of the vehicle. A noteworthy double ended-fork terminal system provides a low contact resistance arrangement while meeting sealing, shielding, and touch-safe requirements in a very compact package. It has the flexibility to interconnect with a wide range of conductor cross-sections, geometry, and materials.





### Applications

- Inverter
- HV Battery
- E-motor

### Technical Features

#### Poles:

2

#### Terminal Size / System:

2.5 mm / Fork contact

#### Conductor Cross-Sections:

25 mm<sup>2</sup> to 50 mm<sup>2</sup>

#### Wire Type:

Shielded

#### Tab Size:

42.4 mm x 2.5 mm x 23 mm

#### Voltage Rating:

1,000 VDC

#### Temperature Range:

-40°C up to 125°C

#### Current Carrying Capability:

Derating factor of 10%  
257 A at 85°C (50 mm<sup>2</sup>)

#### IP Rating, Mated:

IP6K7, IP6K9K

#### IP Rating, Unmated:

IP2XB

#### HV Interlock Option:

Shunted in Plug

#### Latch Access Type:

Lever

#### CPA:

Yes

#### Fire Classification:

V0 (Inner Housing)

#### Vibration Level:

USCAR-2 Class V1

#### Shielding / Options:

Yes

#### Available Codings:

A, B

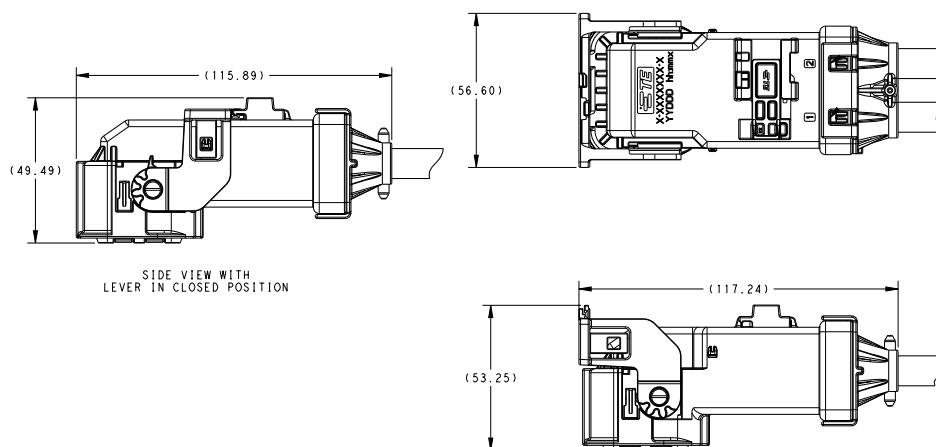
#### Product Specification:

108-160108

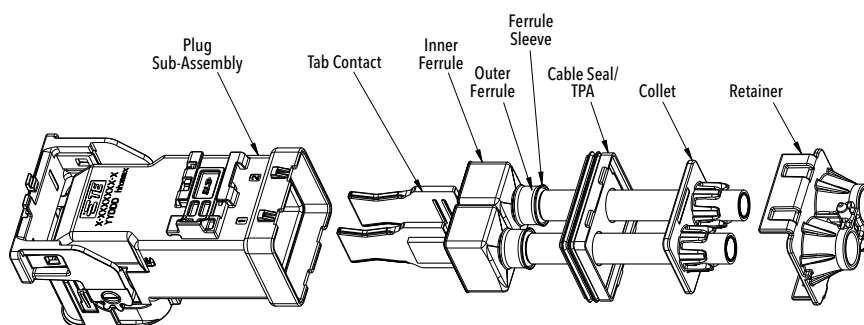
#### Application Specification:

114-162001

## HC-STAK 25 2p hi - Plug 90°



Drawing 2349157 \*



\* Drawing number is NOT the order number!





### Applications

- Inverter
- HV Battery
- E-motor

### Technical Features

**Poles:**  
2

**Terminal Size / System:**  
2.5 mm / Fork contact

**Conductor Cross-Sections:**  
25 mm<sup>2</sup> to 50 mm<sup>2</sup>

**Wire Type:**  
Shielded

**Voltage Rating:**  
1,000 VDC

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

**Current Carrying Capability:**  
Derating factor of 10%  
257 A at 85°C (50 mm<sup>2</sup>)

**IP Rating, Mated:**  
IP6K7, IP6K9K

**IP Rating, Unmated:**  
IP2XB

**HV Interlock Option:**  
Yes

**Latch Access Type:**  
Lever

**Fire Classification:**  
V0

**Vibration Level:**  
USCAR-2 Class V1

**Shielding / Options:**  
Yes

**Available Codings:**  
A, B

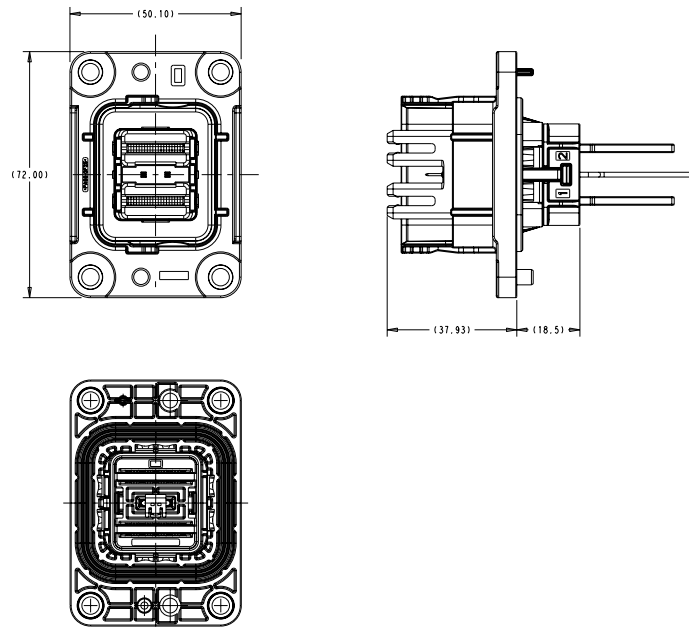
**Product Specification:**  
108-160108

**Application Specification:**  
408-160030

**Inner Housing:**  
2359563-1

**Interface Drawing:**  
2343034

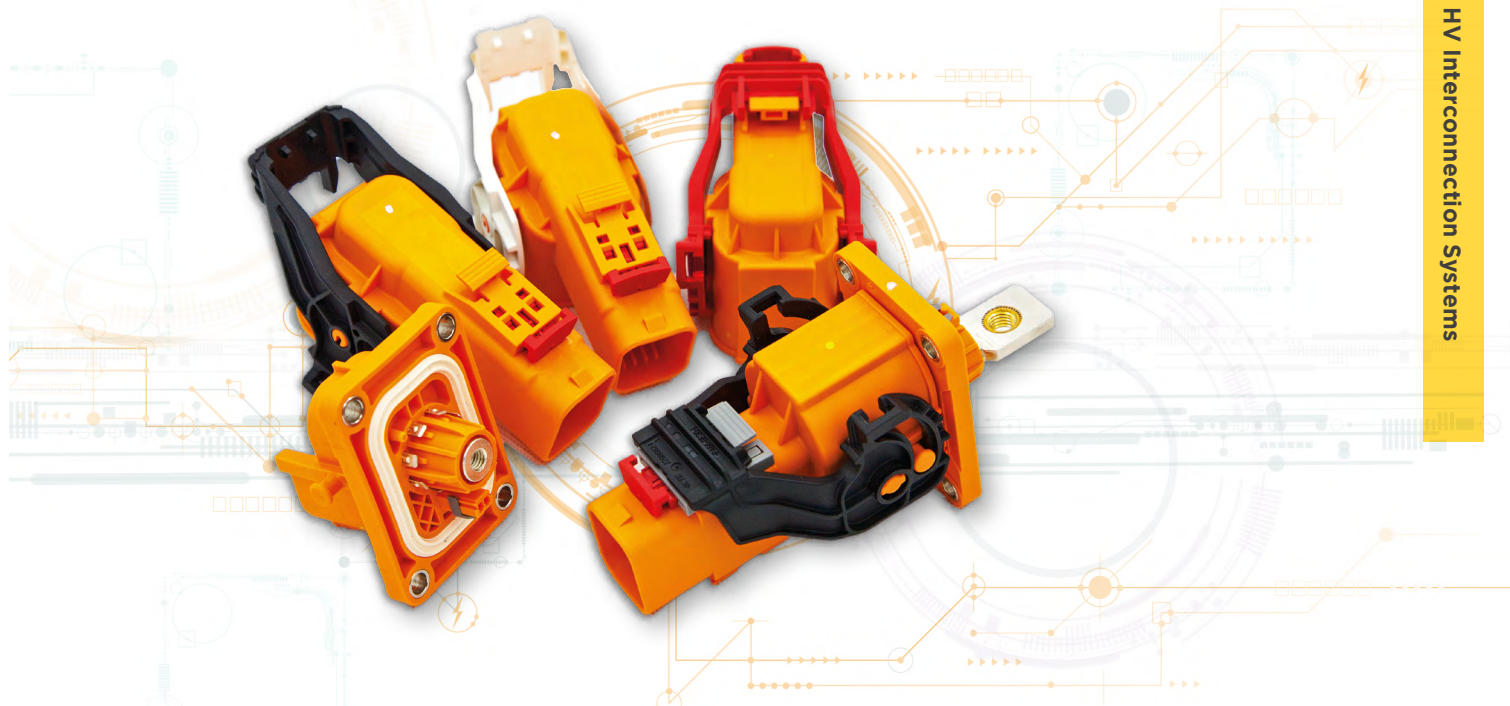
## HC-STAK 25 2p hi - Header



Drawing 2379307 \*

\* Drawing number is NOT the order number!





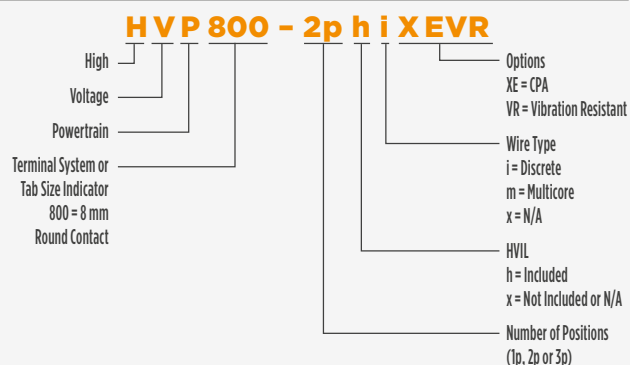
## AMP+ HVP 800 HV INTERCONNECTION SYSTEM INTRODUCTION

The AMP+ HVP 800 HV interconnection system features a robust design that optimizes package size and plug and header selections to create multiple wire harness assembly routing options for currents up to 225 A at 85°C (50 mm<sup>2</sup>).

The system includes touch-proof one-, two-, or three-pole connectors and headers engineered with 90° and 180° plugs with integrated internal HVIL function and EMI shielding. Assembly is simplified with a lever assist for low insertion force.

A wide temperature and wire range, as well as multiple coding options qualify it for use in many hybrid and electric vehicle applications such as inverter, HV battery and under certain conditions e-motor applications.

### Naming Convention HVP 800 Interconnection System





### Applications

- Inverter
- HV Battery
- E-motor

### Technical Features

#### Poles:

1

#### Terminal Size / System:

8 mm round

#### Conductor Cross-Sections:

16 mm<sup>2</sup> to 50 mm<sup>2</sup>

#### Wire Type:

Single-core

#### Voltage Rating:

650 VDC / 850 VDC

#### Temperature Range:

-40°C up to 125°C

#### Current Carrying Capability:

225 A at 85°C (50 mm<sup>2</sup>)

#### IP Rating, Mated:

IP67, IP6K9K, IPXXD

#### IP Rating, Unmated:

IPXXB

#### HV Interlock Option:

Shunted in plug

#### CPA:

Yes

#### Fire Classification:

V0

#### Vibration Level:

SG 2 (LV 215-1)

#### Shielding / Options:

Yes

#### EMC Shielding Resistance:

10 mΩ

#### Available Codings:

A, B, C, D, E, F

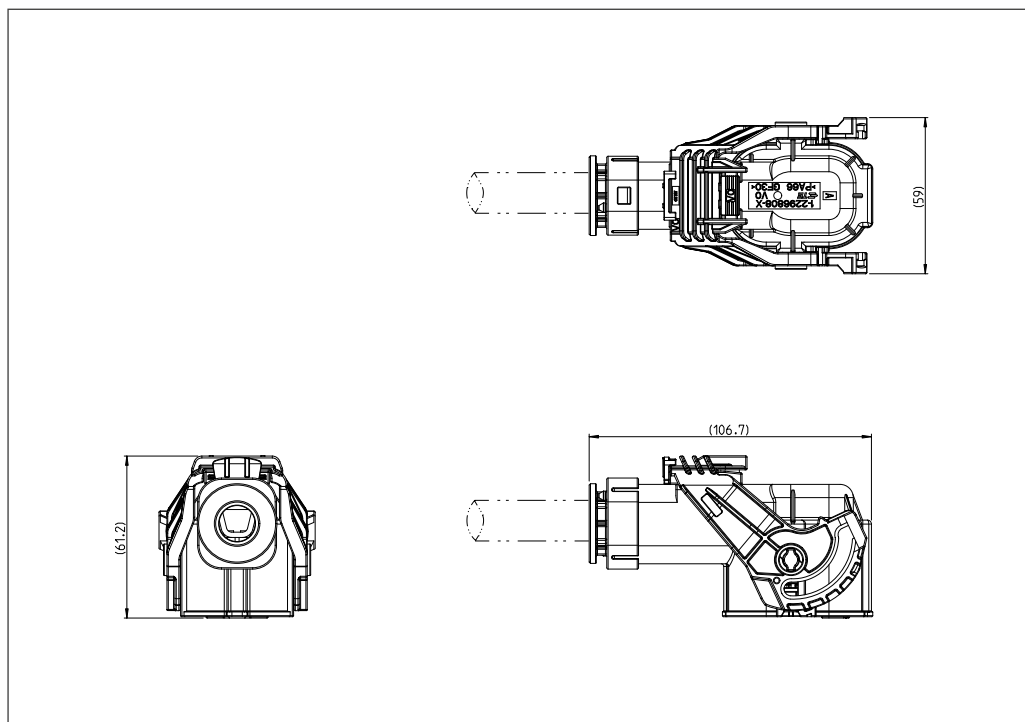
#### Product Specification:

108-101439

#### Application Specification:

114-101062

## AMP+ HVP 800 1p hi XE - Plug 90°



Drawing 2324136 \*

| Cable Direction | Cable Size         | Part Number |
|-----------------|--------------------|-------------|
| 90°             | 50 mm <sup>2</sup> | 2324136-X   |
|                 | 35 mm <sup>2</sup> | 1-2324136-X |
|                 | 25 mm <sup>2</sup> | 2-2324136-X |
|                 | 16 mm <sup>2</sup> | in planning |

Note: X = 1~6, Coding = A~F

\* Drawing number is NOT the order number!



### Applications

- Inverter
- HV Battery
- E-motor

### Technical Features

#### Poles:

1

#### Terminal Size / System:

8.0 mm round contact

#### Conductor Cross-Sections:

16 mm<sup>2</sup> to 50 mm<sup>2</sup>

#### Wire Type:

Single-core

#### Voltage Rating:

1,000 VDC

#### Temperature Range:

-40°C up to 125°C

#### Current Carrying Capability:

225 A at 85°C (50 mm<sup>2</sup>)

#### IP Rating, Mated:

IP67, IP6K9K, IPXXD

#### IP Rating, Unmated:

IPXXB

#### HV Interlock Option:

Shunted in plug

#### CPA:

Yes

#### Fire Classification:

V0

#### Vibration Level:

SG 2 (LV 215-1)

#### Shielding / Options:

Yes

#### EMC Shielding Resistance:

10 mΩ

#### Available Codings:

A, B, C, D, E, F

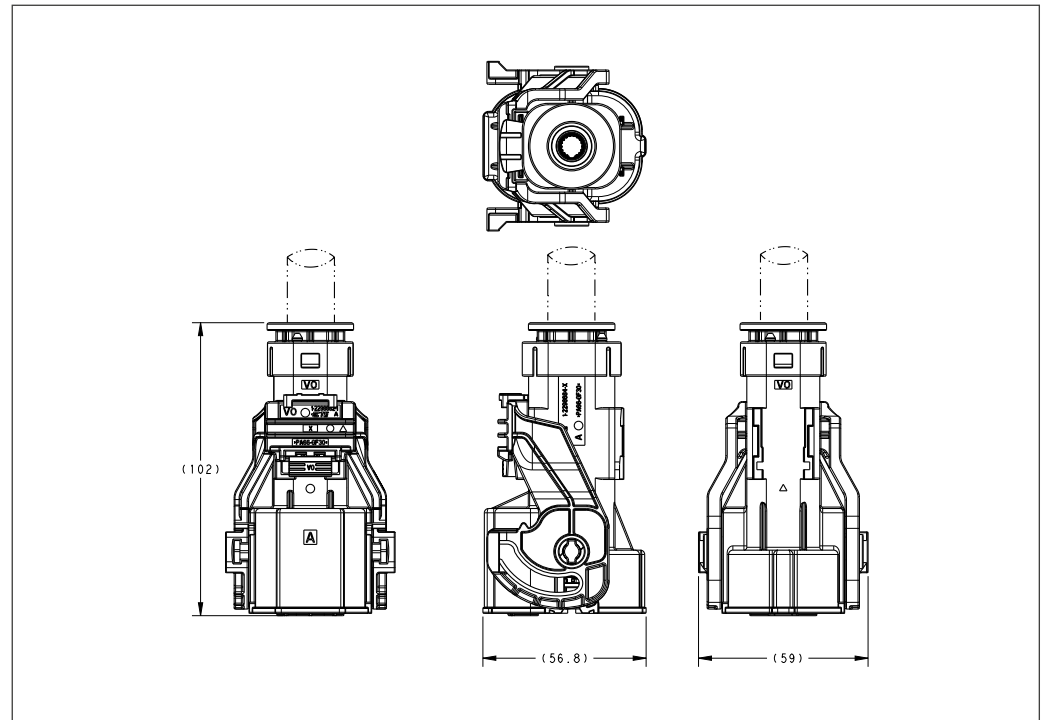
#### Product Specification:

108-101481

#### Application Specification:

114-101063

## AMP+ HVP 800 1p hi XE - Plug 180°



Drawing 2324086 \*

| Cable Direction | Lever Orientation | Cable Size         | Part Number |
|-----------------|-------------------|--------------------|-------------|
| 180°            | Normal            | 50 mm <sup>2</sup> | 2324086-X   |
|                 |                   | 35 mm <sup>2</sup> | 2-2324086-X |
|                 |                   | 25 mm <sup>2</sup> | 4-2324086-X |
|                 | Reverse           | 50 mm <sup>2</sup> | 1-2324086-X |
|                 |                   | 35 mm <sup>2</sup> | 3-2324086-X |
|                 |                   | 25 mm <sup>2</sup> | 5-2324086-X |
|                 |                   | 16 mm <sup>2</sup> | in planning |

Note: X = 1~6, Coding = A~F

\* Drawing number is NOT the order number!



### Applications

- Inverter
- HV Battery
- E-motor

### Technical Features

#### Poles:

1

#### Conductor Cross-Sections:

16 mm<sup>2</sup> to 50 mm<sup>2</sup>

#### Tab Size:

8 mm round

#### Voltage Rating:

1,000 VDC

#### Temperature Range:

-40°C up to 125°C

#### Current Carrying Capability:

225 A at 85°C (50 mm<sup>2</sup>)

#### IP Rating, Mated:

IP67, IP6K9K

#### IP Rating, Unmated:

IPXXB

#### HV Interlock Option:

Shunted in plug

#### Fire Classification:

V0

#### Vibration Level:

SG 2 (LV 215-1)

#### Shielding / Options:

Yes

#### EMC Shielding Resistance:

10 mΩ

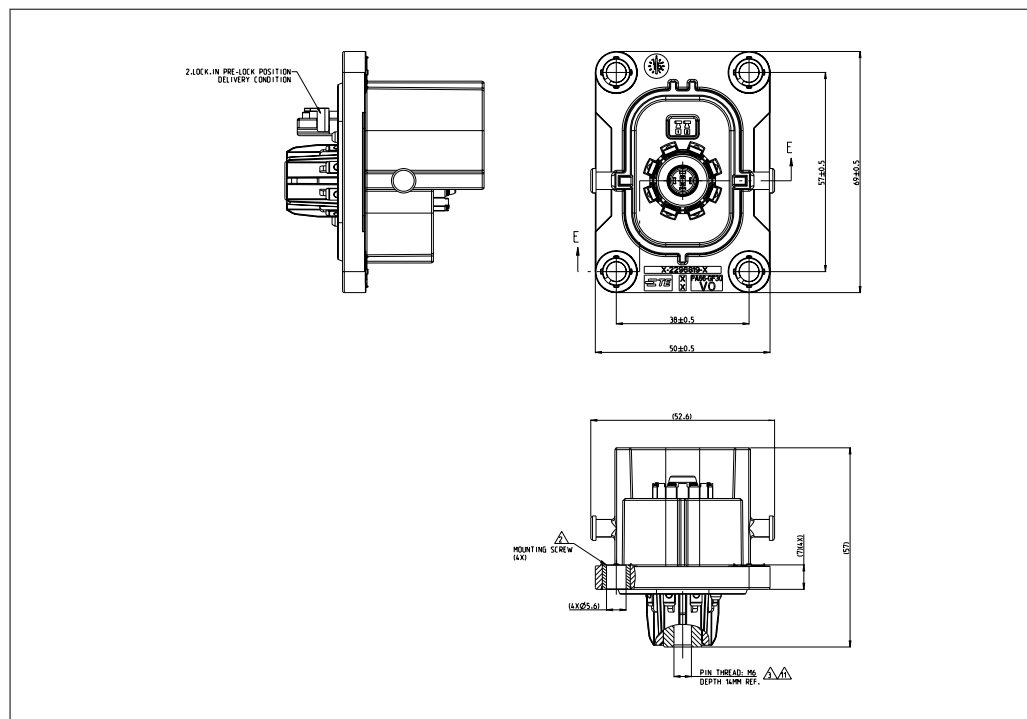
#### Available Codings:

A, B, C, D, E, F

#### Product Specification:

108-101439; 108-101481

## AMP+ HVP 800 1p hi - Header



Drawing 2324108 \*

| Busbar Nut Size | Shipping Cap | Part Number |
|-----------------|--------------|-------------|
| None            | No           | 2324108-X   |
|                 | Yes          | 2-2324108-X |
| M8              | No           | 4-2324108-X |
|                 | Yes          | 5-2324108-X |

Note: X = 1~6, Coding = A~F

\* Drawing number is NOT the order number!



### Applications

- Inverter
- HV Battery
- E-motor

### Technical Features

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

**Conductor Cross-Sections:**  
16 mm<sup>2</sup> to 50 mm<sup>2</sup>

**Wire Type:**  
Single-core

**Voltage Rating:**  
650 VDC / 850 VDC

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

**Current Carrying Capability:**  
225 A at 85°C (50 mm<sup>2</sup>)

**IP Rating, Mated:**  
IP67, IP6K9K

**IP Rating, Unmated:**  
IPXXB

**HV Interlock Option:**  
Shunted in plug

**CPA:**  
Yes

**Fire Classification:**  
HB, V0

**Vibration Level:**  
SG 2 (LV 215-1)

**Shielding / Options:**  
Yes

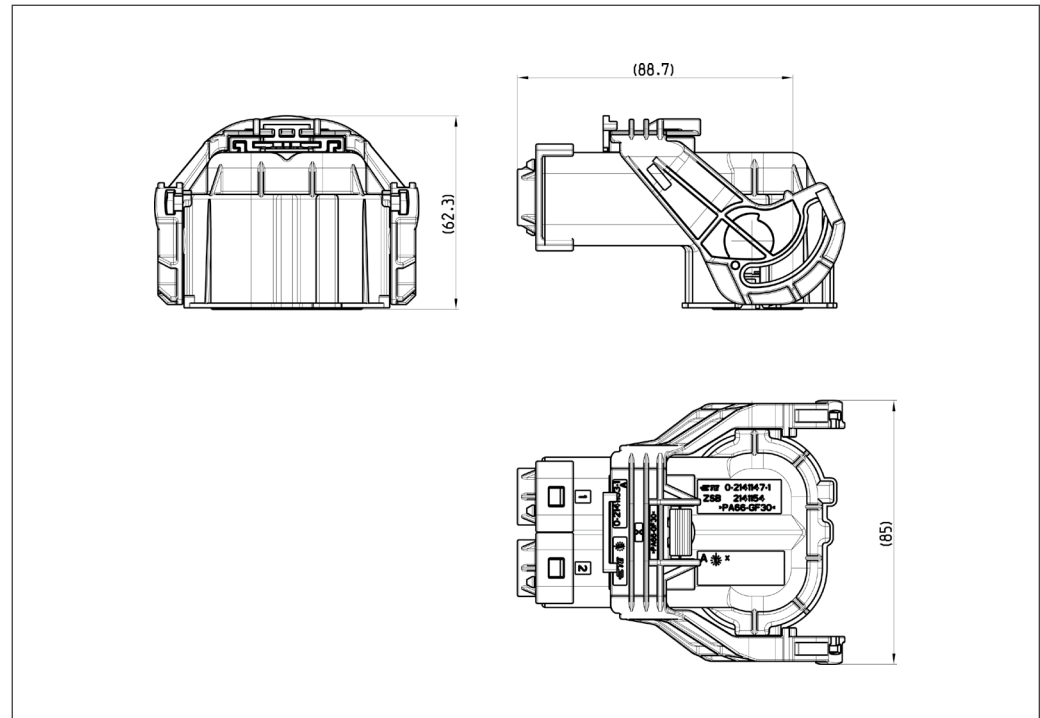
**EMC Shielding Resistance:**  
10 mΩ

**Available Codings:**  
A, B, C, D

**Product Specification:**  
108-94268

**Application Specification:**  
114-94052

## AMP+ HVP 800 2p hi XE - Plug 90°



Drawing 2282334 \*

| Version<br>(Cable Dimension)                    |             | Coding | With CPA | With Lever | Order Information             |
|-------------------------------------------------|-------------|--------|----------|------------|-------------------------------|
| 25 / 35 / 50 mm <sup>2</sup><br>(acc. LV 216-2) | released    | A      | ✓        | ✓          | To be ordered<br>see drawing! |
|                                                 |             | B      | ✓        | ✓          |                               |
|                                                 |             | C      | ✓        | ✓          |                               |
|                                                 |             | D      | ✓        | ✓          |                               |
| 16 mm <sup>2</sup>                              | in planning |        |          |            |                               |

\* Drawing number is NOT the order number!





### Applications

- Inverter
- HV Battery
- E-motor

### Technical Features

#### Poles:

2

#### Terminal Size / System:

8.0 mm round contact

#### Conductor Cross-Sections:

16 mm<sup>2</sup> to 50 mm<sup>2</sup>

#### Wire Type:

Single-core

#### Voltage Rating:

1,000 VDC

#### Temperature Range:

-40°C up to 140°C

#### Current Carrying Capability:

225 A at 85°C (50 mm<sup>2</sup>)

#### IP Rating, Mated:

IP6K9K

#### IP Rating, Unmated:

IPXXB

#### HV Interlock Option:

Shunted in plug

#### CPA:

Yes

#### Fire Classification:

HB, V0

#### Vibration Level:

SG 2 (LV 215-1)

#### Shielding / Options:

Yes

#### EMC Shielding Resistance:

10 mΩ

#### Available Codings:

A, B, C, D

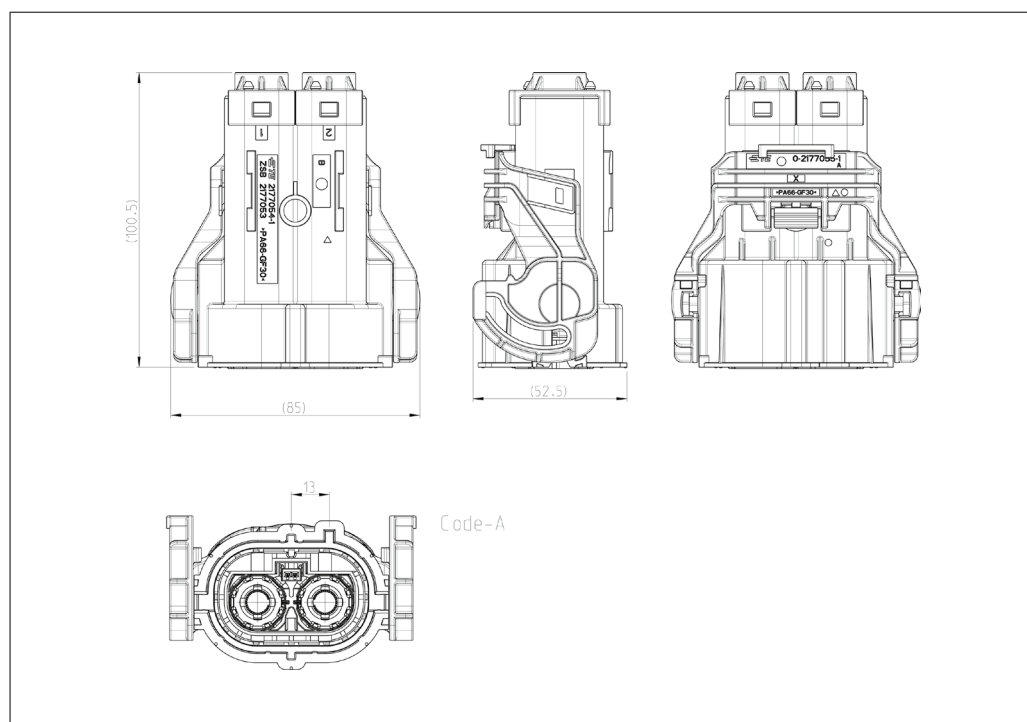
#### Product Specification:

108-94297

#### Application Specification:

114-94130

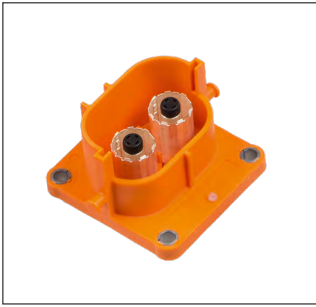
## AMP+ HVP 800 2p hi XE - Plug 180°



Drawing 2177052 \*

| Version<br>(Cable Dimension)                    | Coding      | With CPA | With Lever | Order Information             |
|-------------------------------------------------|-------------|----------|------------|-------------------------------|
| 25 / 35 / 50 mm <sup>2</sup><br>(acc. LV 216-2) | A           | ✓        | ✓          | To be ordered<br>see drawing! |
|                                                 | B           | ✓        | ✓          |                               |
|                                                 | C           | ✓        | ✓          |                               |
|                                                 | D           | ✓        | ✓          |                               |
| 16 mm <sup>2</sup>                              | in planning |          |            |                               |

\* Drawing number is NOT the order number!



### Applications

- Inverter
- HV Battery
- E-motor

### Technical Features

**Poles:**  
2

**Tab Size:**  
8 mm round

**Voltage Rating:**  
1,000 VDC

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

**Current Carrying Capability:**  
225 A at 85°C (50 mm<sup>2</sup>)

**IP Rating, Mated:**  
IP6K9K

**IP Rating, Unmated:**  
IP2XB (touch safe)

**HV Interlock Option:**  
Shunted in plug

**Fire Classification:**  
HB, V0

**Vibration Level:**  
SG 2 (LV 215-1)

**Shielding / Options:**  
Yes

**EMC Shielding Resistance:**  
10 mΩ

**Available Codings:**  
A, B, C, D

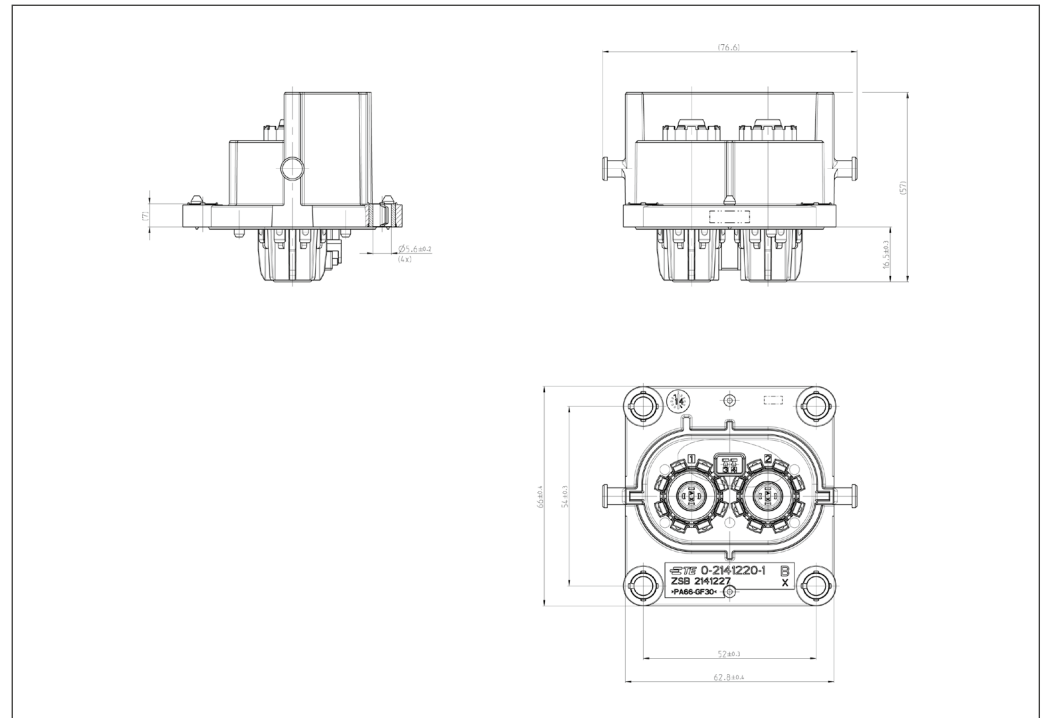
**Product Specification:**  
108-94268; 108-94297

**Application Specification:**  
114-94153

**Interface Drawing:**  
114-94034

**Interface Drawing Adapter Plate:**  
114-94032

## AMP+ HVP 800 2p hi - Header



Drawing 2141227 \*

| Version<br>(Cable Dimension) |          | Coding | Order Information             |
|------------------------------|----------|--------|-------------------------------|
| one for all                  | released | A      | To be ordered<br>see drawing! |
|                              |          | B      |                               |
|                              |          | C      |                               |
|                              |          | D      |                               |

\* Drawing number is NOT the order number!



### Applications

- Inverter
- HV Battery
- E-motor

### Technical Features

#### Terminal Size / System:

8.0 mm round contact

#### Conductor Cross-Sections:

16 mm<sup>2</sup> to 50 mm<sup>2</sup>

#### Wire Type:

Single-core

#### Voltage Rating:

650 VDC / 850 VDC / 1,000 VDC

#### Temperature Range:

-40°C up to 140°C

#### Current Carrying Capability:

225 A at 85°C (50 mm<sup>2</sup>)

#### IP Rating, Mated:

IP6K9K

#### IP Rating, Unmated:

IPXXB

#### HV Interlock Option:

Shunted in plug

#### CPA:

Yes

#### Fire Classification:

HB

#### Vibration Level:

SG 2 (LV 215-1)

#### Shielding / Options:

Yes

#### EMC Shielding Resistance:

10 mΩ

#### Available Codings:

A, B, C, D

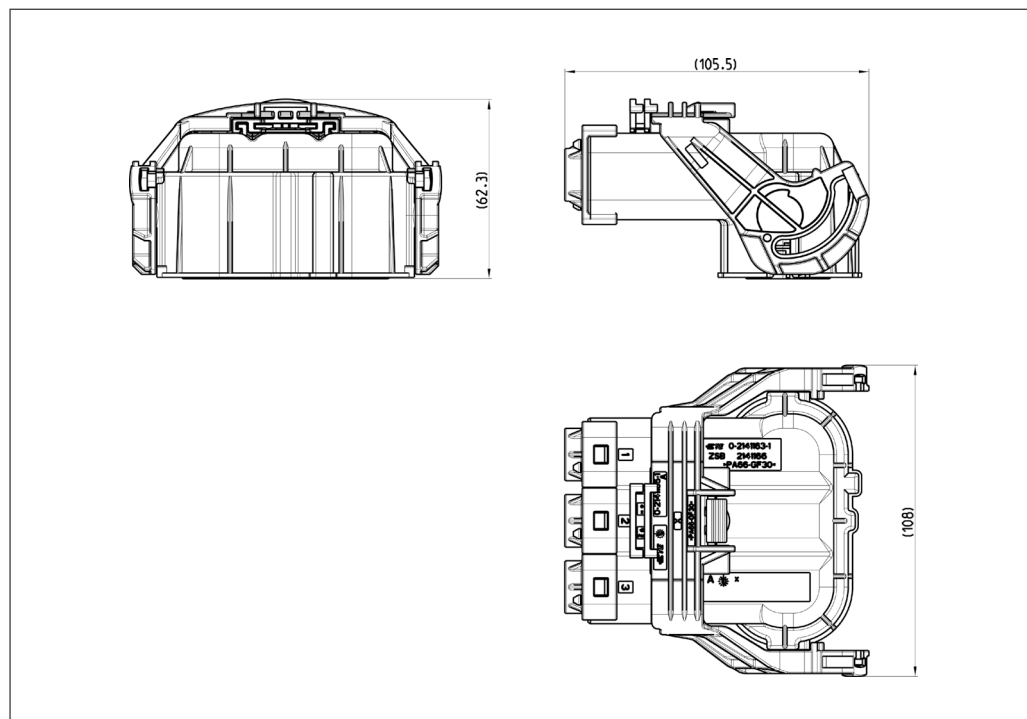
#### Product Specification:

108-94268

#### Application Specification:

114-94052

## AMP+ HVP 800 3p hi XE - Plug 90°



Drawing 2282335 \*

| Version<br>(Cable Dimension)                    |             | Coding | With CPA | With Lever | Order Information             |
|-------------------------------------------------|-------------|--------|----------|------------|-------------------------------|
| 25 / 35 / 50 mm <sup>2</sup><br>(acc. LV 216-2) | released    | A      | ✓        | ✓          | To be ordered<br>see drawing! |
|                                                 |             | B      | ✓        | ✓          |                               |
|                                                 |             | C      | ✓        | ✓          |                               |
|                                                 |             | D      | ✓        | ✓          |                               |
| 16 mm <sup>2</sup>                              | in planning |        |          |            |                               |

\* Drawing number is NOT the order number!



### Applications

- Inverter
- HV Battery
- E-motor

### Technical Features

#### Poles:

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

**Conductor Cross-Sections:**  
16 mm<sup>2</sup> to 50 mm<sup>2</sup>

**Wire Type:**  
Single-core

**Voltage Rating:**  
850 VDC / 1,000 VDC

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

**Current Carrying Capability:**  
225 A at 85°C (50 mm<sup>2</sup>)

**IP Rating, Mated:**  
IP6K9K

**IP Rating, Unmated:**  
IPXXB

**HV Interlock Option:**  
Shunted in plug

**CPA:**  
Yes

**Fire Classification:**  
HB

**Vibration Level:**  
SG 2 (LV 215-1)

**Shielding / Options:**  
Yes

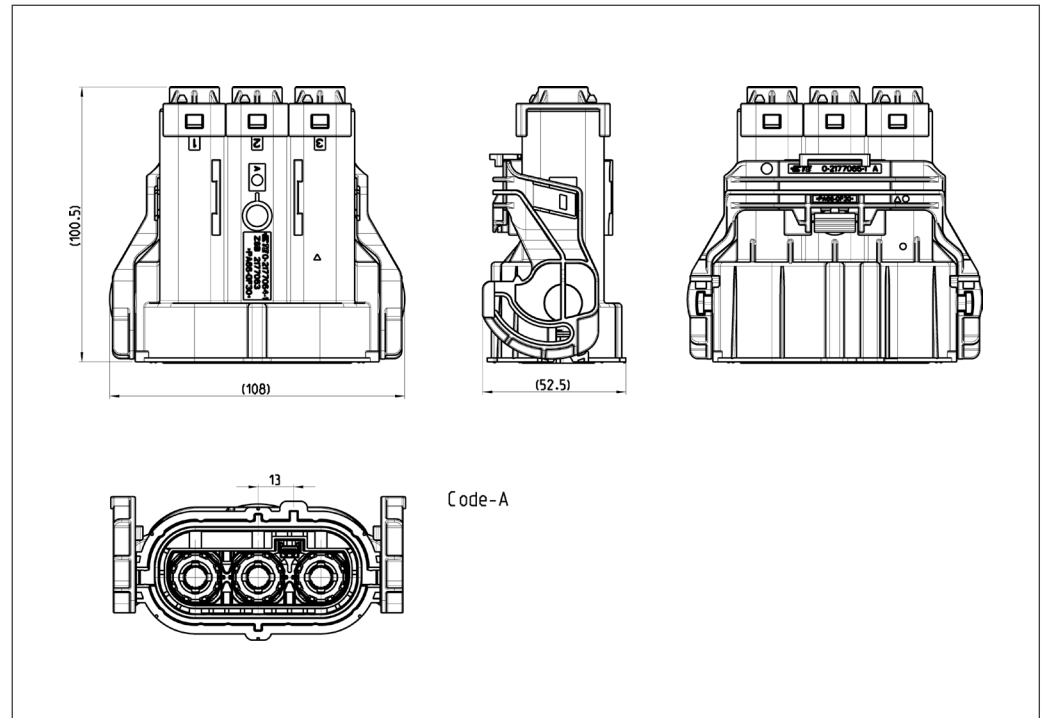
**EMC Shielding Resistance:**  
10 mΩ

**Available Codings:**  
A, B

**Product Specification:**  
108-94297

**Application Specification:**  
114-94130

## AMP+ HVP 800 3p hi XE - Plug 180°



Drawing 2177062 \*

| Version<br>(Cable Dimension)                    |             | Coding | With CPA | With Lever | Order Information             |
|-------------------------------------------------|-------------|--------|----------|------------|-------------------------------|
| 25 / 35 / 50 mm <sup>2</sup><br>(acc. LV 216-2) | released    | A      | ✓        | ✓          | To be ordered<br>see drawing! |
|                                                 |             | A      | ✓        | ✓          |                               |
|                                                 |             | B      | ✓        | ✓          |                               |
|                                                 |             | B      | ✓        | ✓          |                               |
| 16 mm <sup>2</sup>                              | in planning |        |          |            |                               |

\* Drawing number is NOT the order number!



## Applications

- Inverter
- HV Battery
- E-motor

## Technical Features

**Poles:**  
3

**Tab Size:**  
8 mm round

**Voltage Rating:**  
1,000 VDC

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

**Current Carrying Capability:**  
225 A at 85°C (50 mm<sup>2</sup>)

**IP Rating, Mated:**  
IP67, IP6K9K

**IP Rating, Unmated:**  
IP2XB (touch safe)

**HV Interlock Option:**  
Shunted in plug

**Fire Classification:**  
HB

**Vibration Level:**  
SG 2 (LV 215-1)

**Shielding / Options:**  
Yes

**EMC Shielding Resistance:**  
10 mΩ

**Available Codings:**  
A, B, C, D

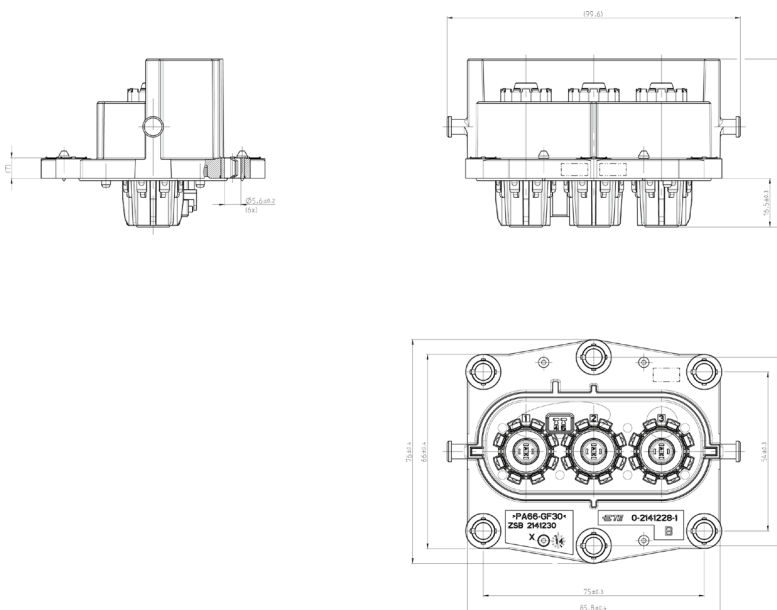
**Product Specification:**  
108-94268; 108-94297

**Application Specification:**  
114-94153

**Interface Drawing:**  
114-94034

**Interface Drawing Adapter Plate:**  
114-94032

## AMP+ HVP 800 3p hi - Header

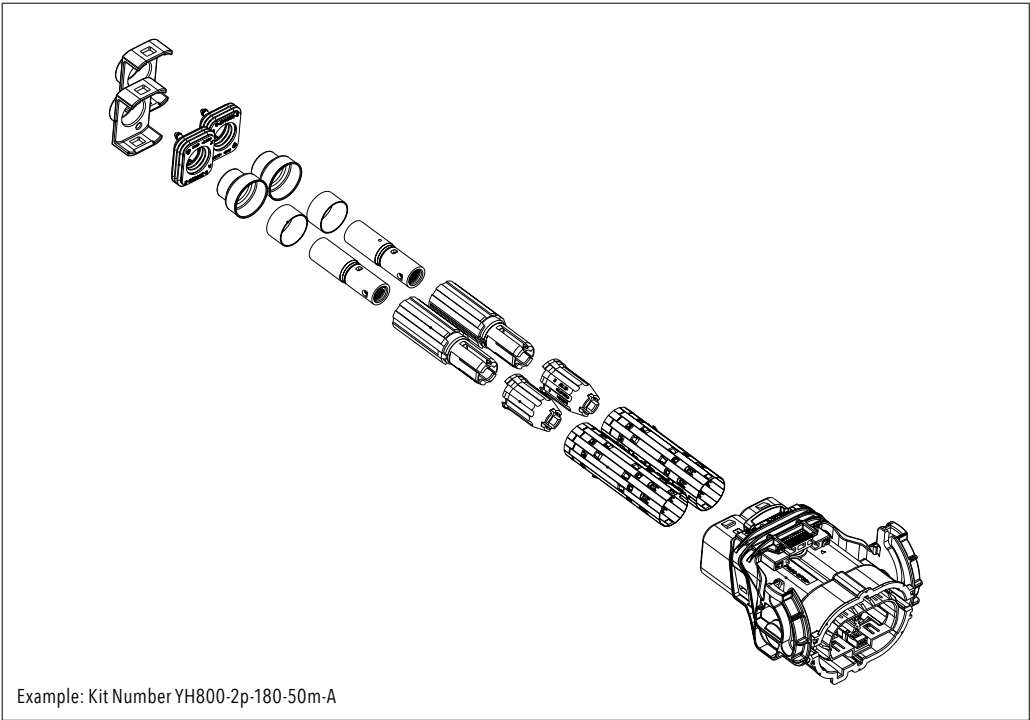


Drawing 2141230 \*

| Version<br>(Cable Dimension) |          | Coding | Order Information             |
|------------------------------|----------|--------|-------------------------------|
| one for all                  | released | A      | To be ordered<br>see drawing! |
|                              |          | B      |                               |
|                              |          | C      |                               |
|                              |          | D      |                               |

\* Drawing number is NOT the order number!

AMP+ HVP 800 Connector System Kits



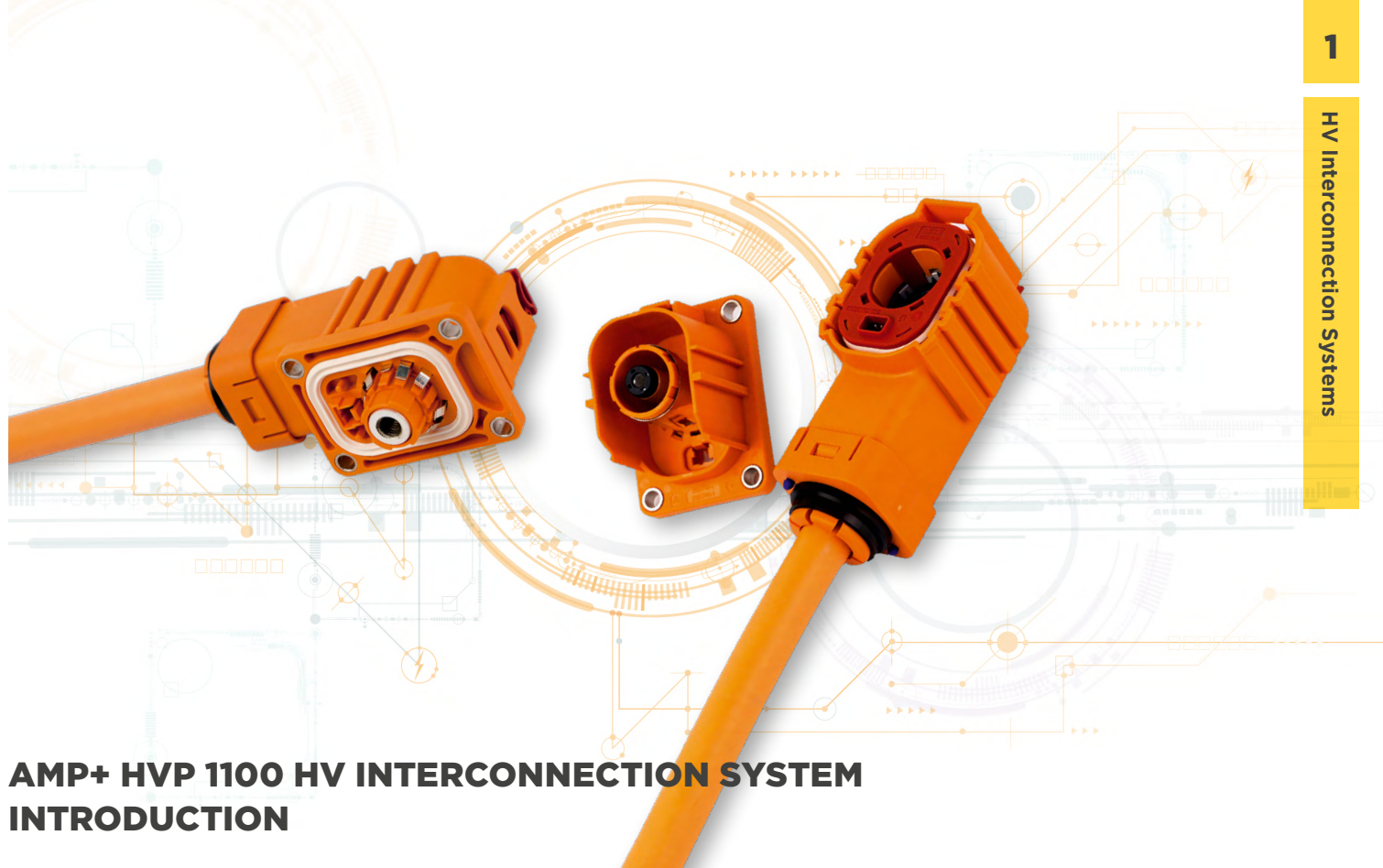
AMP+ HVP 800 Connector System Kits \*)

| Connector | Position | Cable<br>(mm <sup>2</sup> ) | Mating<br>Orientation | Key | LADD Connector Kit<br>Number | Mating Header<br>Part Number | LADD Header Kit<br>Number |
|-----------|----------|-----------------------------|-----------------------|-----|------------------------------|------------------------------|---------------------------|
| HVP 800   | 2        | 50                          | 90°                   | A   | YHV800-2p-90-50m-A           | 2141227-1                    | YHVA800-2P-HDR-A-0        |
|           |          |                             |                       | B   | YHV800-2p-90-50m-B           | 2141227-2                    | YHVA800-2P-HDR-B-0        |
|           |          |                             | 180°                  | A   | YH800-2p-180-50m-A           | 2141227-1                    | YHVA800-2P-HDR-A-0        |
|           |          |                             |                       | B   | YH800-2p-180-50m-B           | 2141227-2                    | YHVA800-2P-HDR-B-0        |
|           | 3        | 50                          | 90°                   | A   | YHV800-3p-90-50m-A           | 2141230-1                    | YHVA800-3p-hdr-A-0        |
|           |          |                             |                       | B   | YHV800-3p-90-50m-B           | 2141230-2                    | YHVA800-3p-hdr-B-0        |
|           |          |                             | 180°                  | A   | YH800-3p-180-50m-A           | 2141230-1                    | YHVA800-3p-hdr-A-0        |
|           |          |                             |                       | B   | YH800-3p-180-50m-B           | 2141230-2                    | YHVA800-3p-hdr-B-0        |

\*) Kits include HVIL terminals





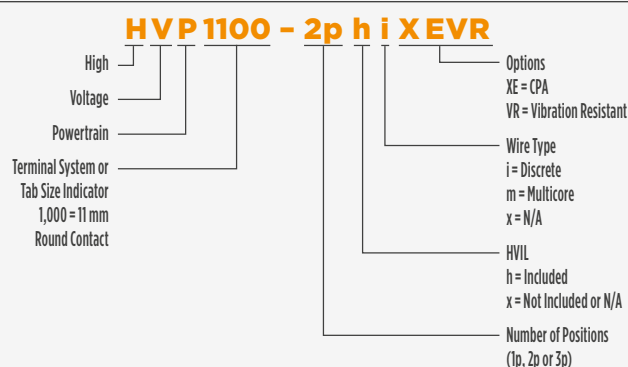


## AMP+ HVP 1100 HV INTERCONNECTION SYSTEM INTRODUCTION

AMP+ HVP 1100 high-current interconnection system is a performant one-pole, finger proof and touch safe system. It is designed for flexibility and offers the options required for inverter, e-motor and HV battery applications.

The system provides a current carrying capability up to 300 A at 85°C (70 mm<sup>2</sup>), and a cable range between 50 mm<sup>2</sup> and 70 mm<sup>2</sup> individually shielded wire. In addition it features an integrated internal HVIL for package size optimization.

### Naming Convention HVP 1100 Interconnection System





### Applications

- Inverter
- HV Battery
- E-motor

### Technical Features

#### Poles:

1

#### Terminal Size / System:

11 mm round contact

#### Conductor Cross-Sections:

70 mm<sup>2</sup>

#### Wire Type:

Single-core

#### Voltage Rating:

750 VDC

#### Temperature Range:

-40°C up to 125°C

#### Current Carrying Capability:

300 A at 85°C (70 mm<sup>2</sup>)

#### IP Rating, Mated:

IP6K7, IP6K9K

#### IP Rating, Unmated:

IP2XB

#### HV Interlock Option:

Integrated, Internal

#### CPA:

Yes

#### Fire Classification:

HB

#### Vibration Level:

USCAR-2 Class V1

#### Shielding / Options:

Yes

#### EMC Shielding Resistance:

10 mΩ

#### Available Codings:

A, B, C, D, E, F

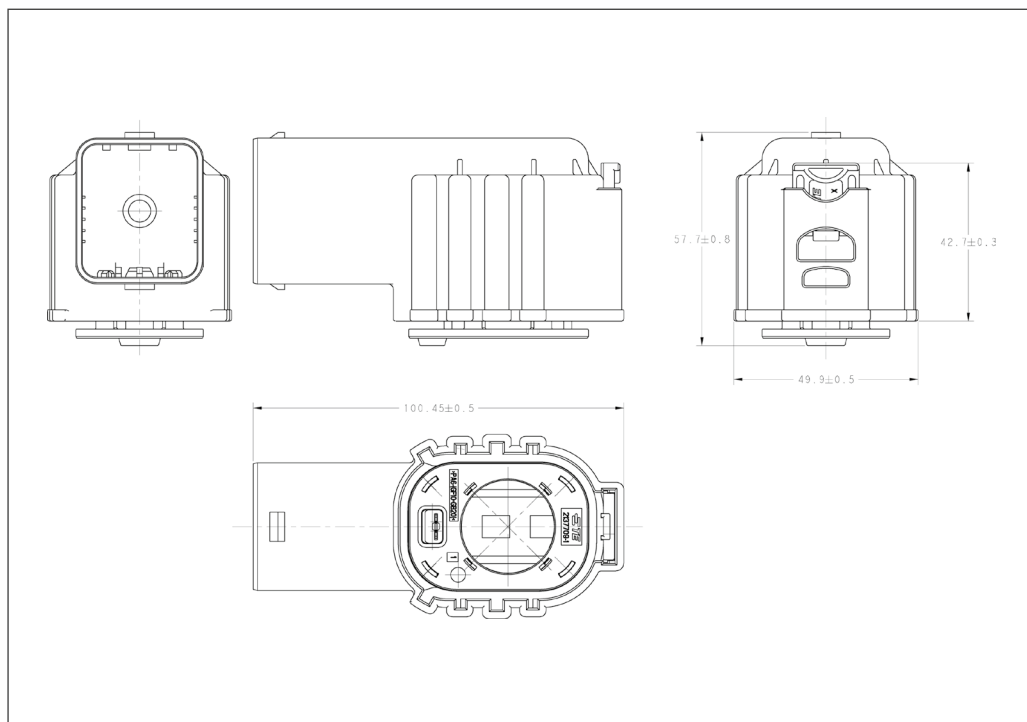
#### Product Specification:

108-101203

#### Application Specification:

114-101010

## AMP+ HVP 1100 1p hi XE - Plug 90°



Drawing 2137704 \*

| Version<br>(Cable Dimension) | Coding      | Order Information |
|------------------------------|-------------|-------------------|
| 1 x 70 mm <sup>2</sup>       | released    | A                 |
|                              | in planning | B                 |
|                              | in planning | C                 |
|                              | in planning | D                 |
|                              | in planning | E                 |
|                              | in planning | F                 |

To be ordered  
see drawing!

\* Drawing number is NOT the order number!



Applications

- Inverter
- HV Battery
- E-motor

Technical Features

**Poles:**  
1

**Tab Size:**  
11 mm round

**Voltage Rating:**  
750 VDC

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

**Current Carrying Capability:**  
300 A at 85°C (70 mm<sup>2</sup>)

**IP Rating, Mated:**  
IP6K7, IP6K9K

**IP Rating, Unmated:**  
IP2XB

**HV Interlock Option:**  
Integrated, Internal

**Fire Classification:**  
HB

**Vibration Level:**  
USCAR-2 Class V1

**Shielding / Options:**  
Yes

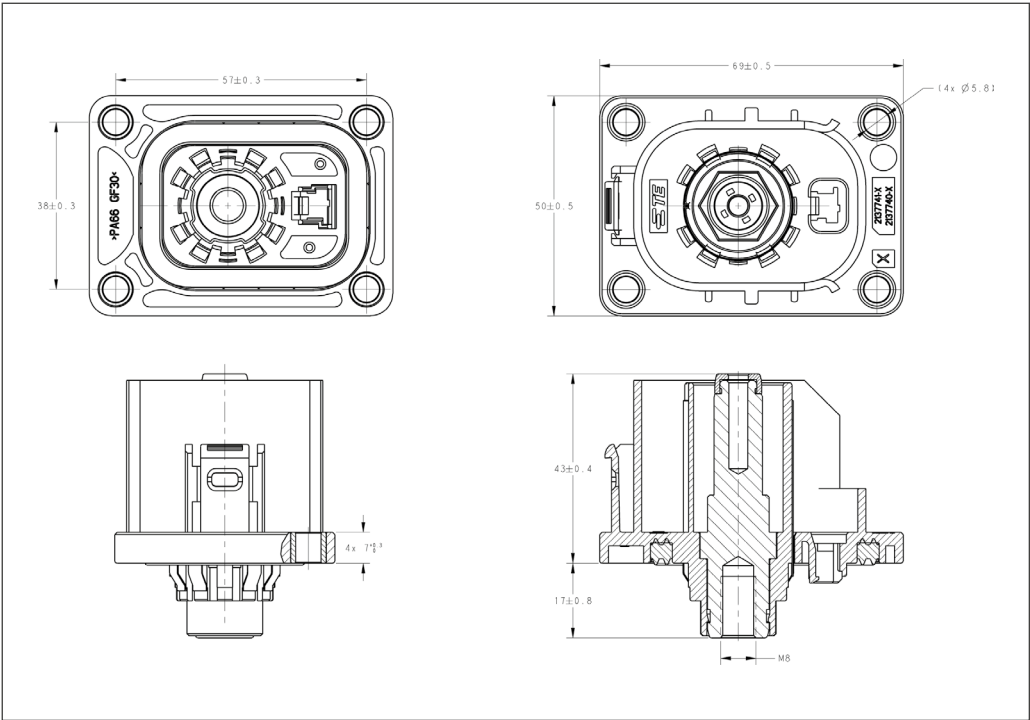
**EMC Shielding Resistance:**  
10 mΩ

**Available Codings:**  
A, B, C, D, E, F

**Product Specification:**  
108-101203

**Application Specification:**  
114-101010

AMP+ HVP 1100 1p hi XE - Header

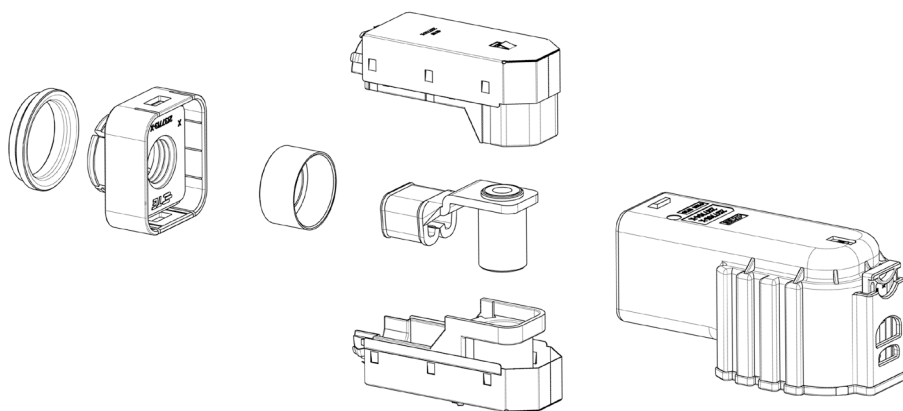


Drawing 2137740 \*

|             | Coding | Order Information             |
|-------------|--------|-------------------------------|
| released    | A      | To be ordered<br>see drawing! |
| in planning | B      |                               |
| in planning | C      |                               |
| in planning | D      |                               |
| in planning | E      |                               |
| in planning | F      |                               |

\* Drawing number is NOT the order number!

## AMP+ HVP 1100 Connector System Kits



Example: Kit Number YHVP1100-1P-90-A-0

## AMP+ HVP 1100 Connector System Kits \*)

| Connector | Position | Cable<br>(mm <sup>2</sup> ) | Key | LADD Connector Kit<br>Number | Mating Header<br>Part Number | LADD Header Kit<br>Number |
|-----------|----------|-----------------------------|-----|------------------------------|------------------------------|---------------------------|
| HVP 1100  | 1        | 70                          | A   | YHVP1100-1P-90-A-0           | 2137740-1                    | YHVP1100-1PH-HDR-A        |
|           |          |                             | B   | YHVP1100-1P-90-B-0           | 2137740-2                    | YHVP1100-1PH-HDR-B        |

\*) Kits include HVIL terminals



AMP+ IPT ring tongue terminals enable easy and flexible adaption to the various powertrain applications especially inverter, e-motor and HV battery applications.

The diagram shows the acronym **IPT - 2p h i XEVR** in orange. Below it, a tree structure in purple lines connects the letters to their meanings:

- I**: High Voltage Powertrain
- P**: Options
  - XE**: CPA
  - VR**: Vibration Resistant
- T**: Wire Type
  - i**: Discrete
  - m**: Multicore
  - x**: N/A
- 2p**: HVIL
  - h**: Included
  - x**: Not Included or N/A
- h**: Number of Positions (1p, 2p or 3p)



### Applications

- Inverter
- HV Battery
- E-motor

### Technical Features

#### Poles:

1

#### Terminal Size / System:

Ring tongue / Screwed

#### Conductor Cross-Sections:

16 mm<sup>2</sup> to 50 mm<sup>2</sup>

#### Wire Type:

Single-core

#### Voltage Rating:

1,000 VDC

#### Temperature Range:

-40°C up to 140°C

#### Current Carrying Capability:

290 A at 85°C (50 mm<sup>2</sup>)

#### IP Rating, Mated:

IP6K9K

#### HV Interlock Option:

No

#### CPA:

No

#### Fire Classification:

HB

#### Vibration Level:

SG 4 (LV 215-1)

#### Shielding / Options:

Yes

#### EMC Shielding Resistance:

10 mΩ

#### Available Codings:

A, B, C, D, E, F

#### Product Specification:

108-94293

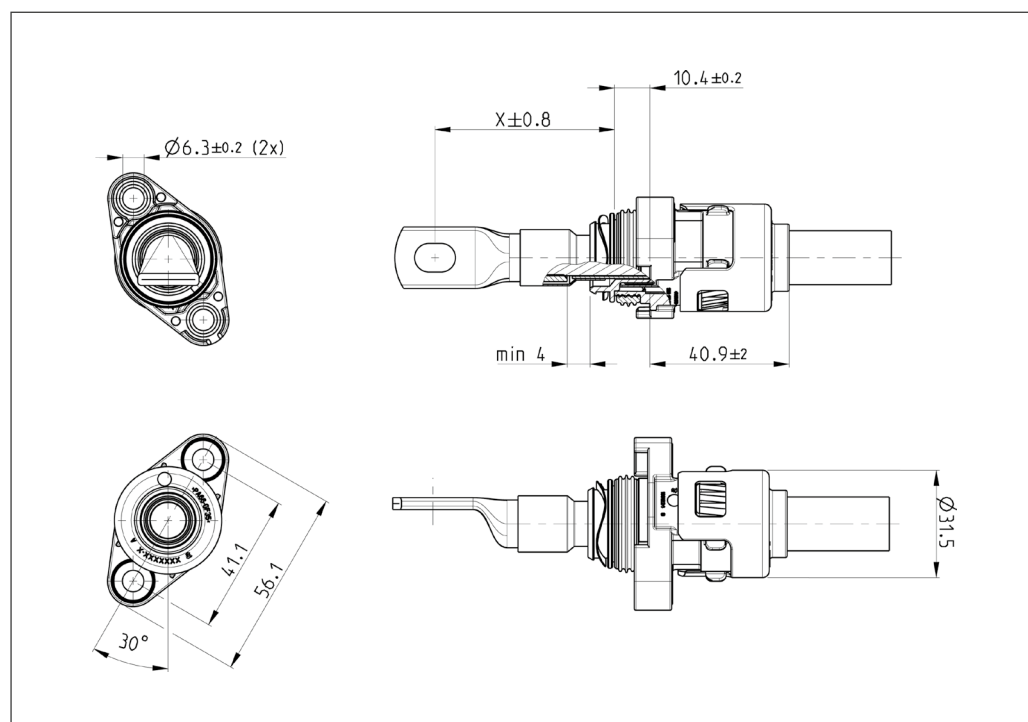
#### Application Specification:

114-94133

#### Interface Drawing:

114-94132-1

## AMP+ IPT 1p xi Shielded Ring Tongue Terminal



Drawing 114-94131-1 \*

| Version<br>(Cable Dimension)                    |             | Coding | Order Information             |
|-------------------------------------------------|-------------|--------|-------------------------------|
| 25 / 35 / 50 mm <sup>2</sup><br>(acc. LV 216-2) | released    | A      | To be ordered<br>see drawing! |
|                                                 |             | B      |                               |
|                                                 |             | C      |                               |
|                                                 |             | D      |                               |
|                                                 |             | E      |                               |
|                                                 |             | F      |                               |
| 16 mm <sup>2</sup>                              | in planning |        |                               |

\* Drawing number is NOT the order number!



Applications

- Inverter
- HV Battery
- E-motor

Technical Features

**Poles:**  
2

**Terminal Size / System:**  
Ring tongue / Screwed

**Conductor Cross-Sections:**  
16 mm² to 50 mm²

**Wire Type:**  
Single-core

**Voltage Rating:**  
1,000 VDC

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

**Current Carrying Capability:**  
290 A at 85°C (50 mm²)

**IP Rating, Mated:**  
IP6K9K

**HV Interlock Option:**  
No

**CPA:**  
No

**Fire Classification:**  
HB

**Vibration Level:**  
SG 4 (LV 215-1)

**Shielding / Options:**  
Yes

**EMC Shielding Resistance:**  
10 mΩ

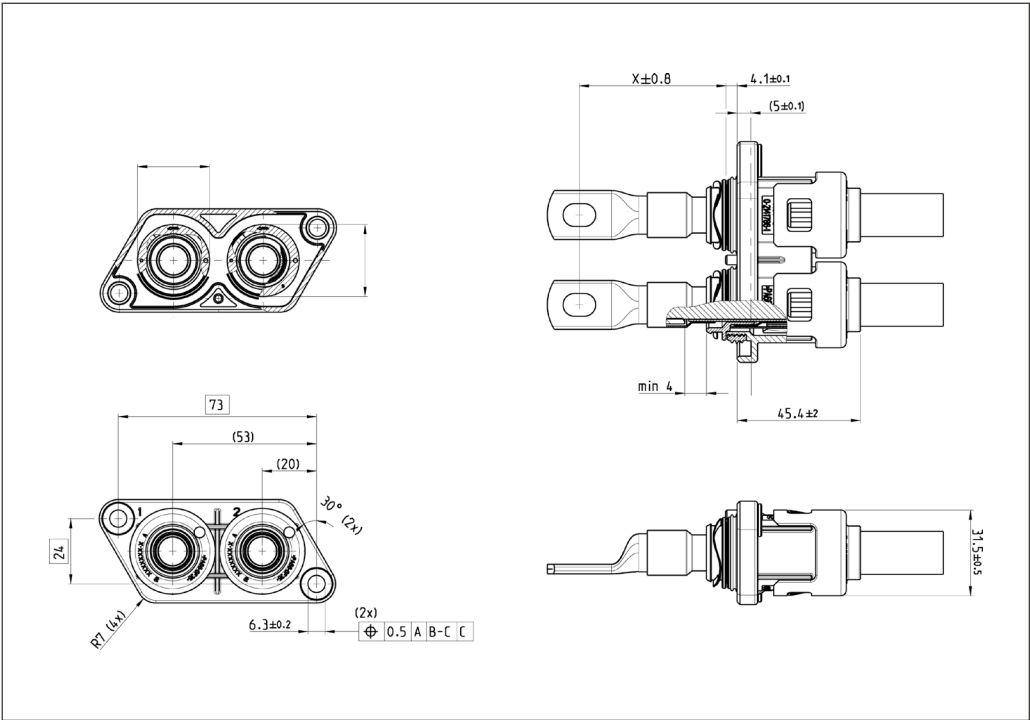
**Available Codings:**  
A

**Product Specification:**  
108-94293

**Application Specification:**  
114-94133

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

AMP+ IPT 2p xi Shielded Ring Tongue Terminal



Drawing 114-94131-2 \*

| Version<br>(Cable Dimension) |             | Coding | Order Information             |
|------------------------------|-------------|--------|-------------------------------|
| 25 / 35 / 50 mm²             | released    | A      | To be ordered<br>see drawing! |
| 16 mm²                       | in planning |        |                               |

\* Drawing number is NOT the order number!





## Applications

- Inverter
- HV Battery
- E-motor

## Technical Features

**Poles:**  
3

**Terminal Size / System:**  
Ring tongue / Screwed

**Conductor Cross-Sections:**  
16 mm<sup>2</sup> to 50 mm<sup>2</sup>

**Wire Type:**  
Single-core

**Voltage Rating:**  
1,000 VDC

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

**Current Carrying Capability:**  
290 A at 85°C (50 mm<sup>2</sup>)

**IP Rating, Mated:**  
IP6K9K

**HV Interlock Option:**  
No

**CPA:**  
No

**Fire Classification:**  
HB

**Vibration Level:**  
SG 4 (LV 215-1)

**Shielding / Options:**  
Yes

**EMC Shielding Resistance:**  
10 mΩ

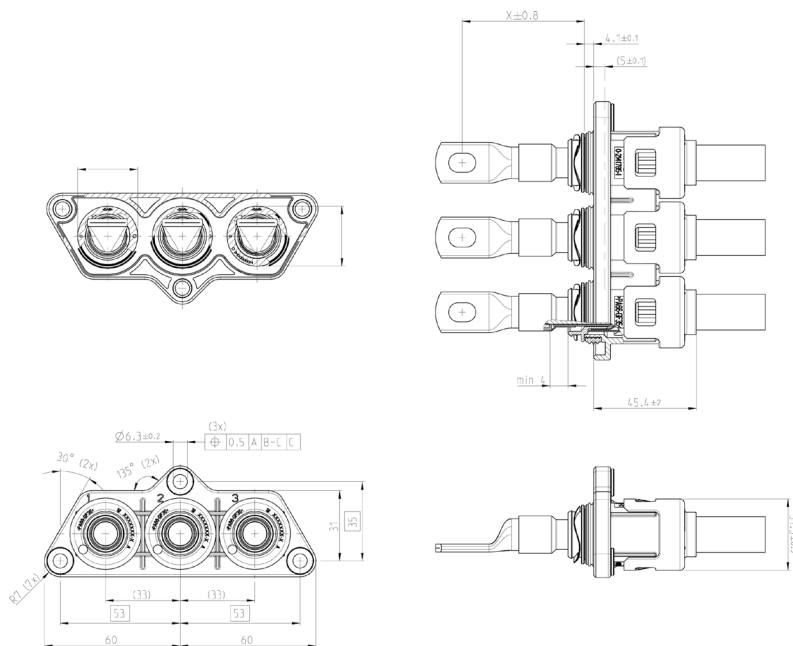
**Available Codings:**  
A

**Product Specification:**  
108-94293

**Application Specification:**  
114-94133

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

### AMP+ IPT 3p xi Shielded Ring Tongue Terminal

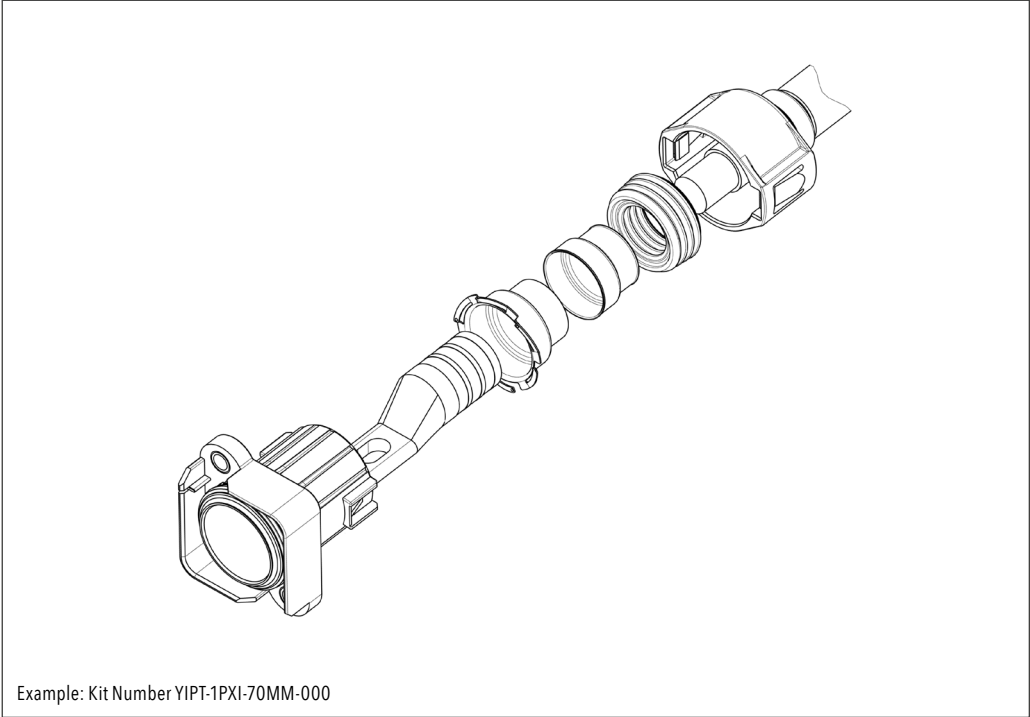


Drawing 114-94131-3 \*

| Version<br>(Cable Dimension) |             | Coding | Order Information             |
|------------------------------|-------------|--------|-------------------------------|
| 25 / 35 / 50 mm²             | released    | A      | To be ordered<br>see drawing! |
| 16 mm²                       | in planning |        |                               |

\* Drawing number is NOT the order number!

AMP+ IPT Connector System Kits

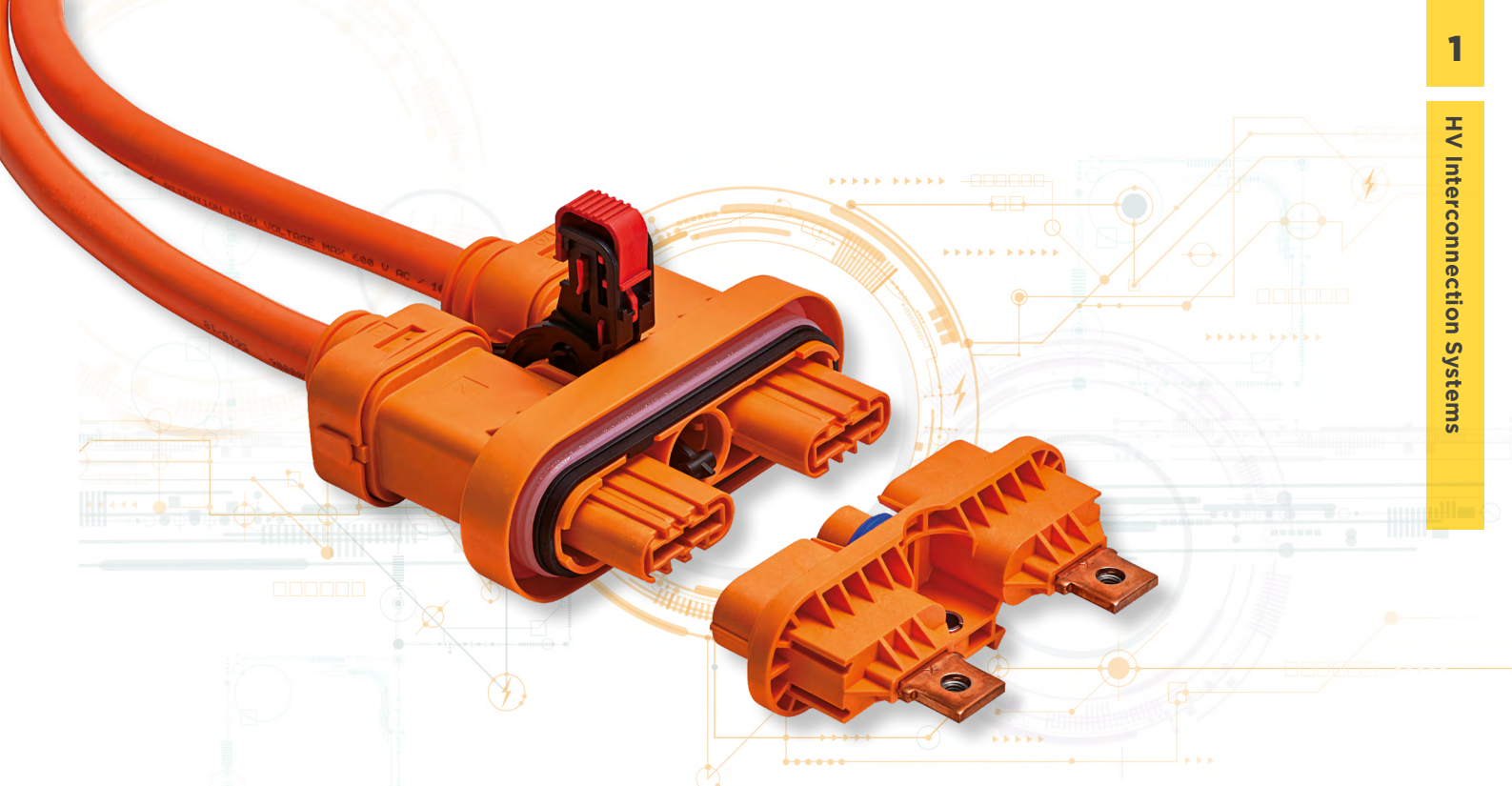


AMP+ IPT Connector System Kits \*)

| Connector | Position | Cable<br>(mm <sup>2</sup> ) | Key | LADD Connector Kit<br>Number |
|-----------|----------|-----------------------------|-----|------------------------------|
| IPT       | 1        | 70                          | A   | YIPT-1PXI-70MM-000           |
|           |          | 95                          | A   | YIPT-1PXI-95MM-000           |
|           |          | 120                         | A   | YIPT-1PXI-120MM-00           |
|           | 2        | 50                          | N/A | YIPT-2pxi-00000000           |
|           | 3        | 50                          | N/A | YIPT-3pxi-00000000           |

\*) Kits include HVIL terminals





## AMP+ HVU 2100 HV UNSHIELDED INTERCONNECTION SYSTEM INTRODUCTION

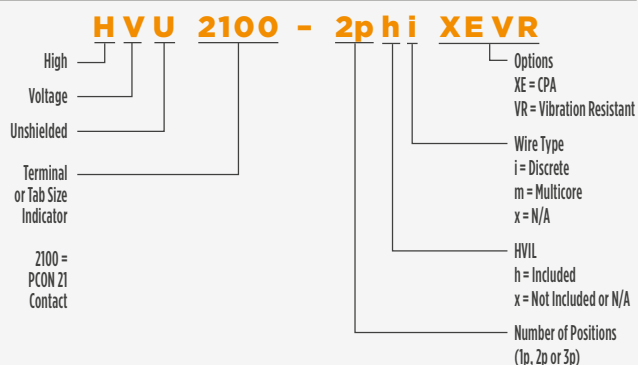
The AMP+ HVU 2100 two-pole connector for unshielded charging applications allows for a current of up to 372 A at 85°C (95 mm<sup>2</sup>) cable and achieves vibration class LV 215 for severity level 2. The system is capable of handling voltage levels up to 1,000 VDC.

The connector system includes a tool activated CPA allowing for optimized packaging size and routing flexibility. In addition it provides finger protection according to UL standard. The header uses V0 flame resistant isolation material.

The HVU 2100 connector system can be applied to DC charging, inverter, e-motor and HV battery applications.

### Naming Convention

#### AMP+ HVU 2100 Interconnection System





### Applications

- Inverter
- HV Battery
- E-motor

### Technical Features

#### Poles:

2

#### Terminal Size / System:

PCON 21

#### Conductor Cross-Sections:

25 mm<sup>2</sup> to 95 mm<sup>2</sup>

#### Wire Type:

Single-core

#### Voltage Rating:

1,000 VDC

#### Temperature Range:

-40°C up to 140°C

#### Current Carrying Capability:

350 A at 60°C (95 mm<sup>2</sup>)

#### IP Rating, Mated:

IP67, IP6K9K, IPXXD

#### IP Rating, Unmated:

IPXXB+ (UL finger + 2 mm / 30 N)

#### CPA:

Yes

#### Fire Classification:

HB

#### Vibration Level:

SG 2 (LV 215-1)

#### Shielding / Options:

N/A

#### EMC Shielding Resistance:

N/A

#### Available Codings:

A, B

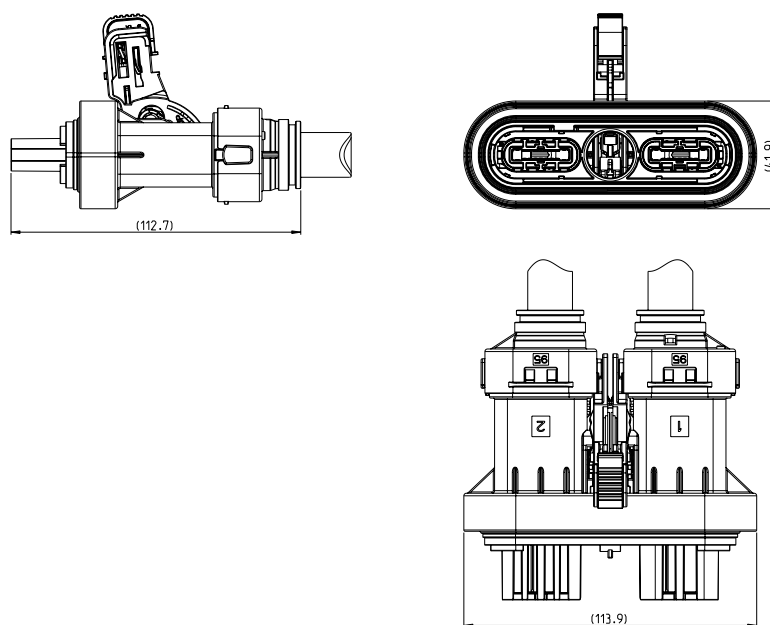
#### Product Specification:

108-94682

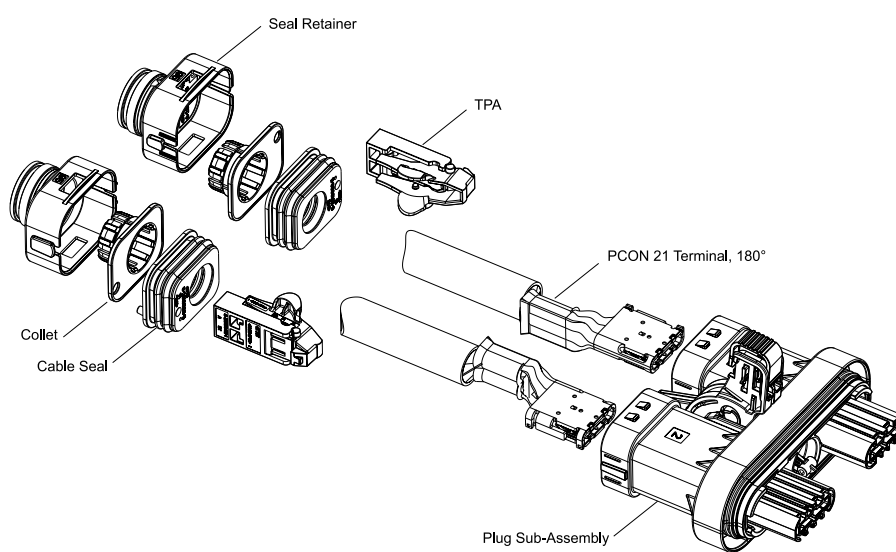
#### Application Specification:

114-94551

## AMP+ HVU 2100 2p xi XE - Plug



Drawing 2328809 \*



\* Drawing number is NOT the order number!



### Applications

- Inverter
- HV Battery
- E-motor

### Technical Features

**Poles:**  
2

**Tab Size:**  
21 mm incl. finger protection

**Voltage Rating:**  
1,000 VDC

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

**Current Carrying Capability:**  
372 A at 85°C (95 mm<sup>2</sup>)

**IP Rating, Mated:**  
IP67, IP6K9K

**IP Rating, Unmated:**  
IPXXB + (UL finger + 2 mm / 30 N)

**Fire Classification:**  
V0

**Vibration Level:**  
SG 2 (LV 215-1)

**Shielding / Options:**  
N/A

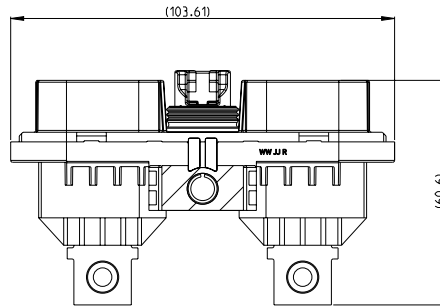
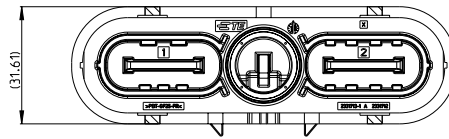
**EMC Shielding Resistance:**  
N/A

**Available Codings:**  
A

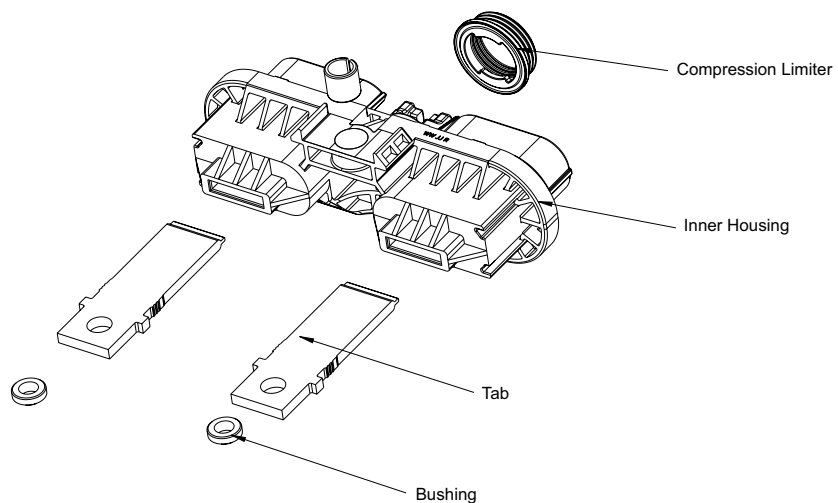
**Product Specification:**  
108-94682

**Application Specification:**  
114-94551

### AMP+ HVU 2100 2p xi - Header



Drawing 2331712 \*



\* Drawing number is NOT the order number!







## AMP+ CHARGING INLETS - CABLE ASSEMBLIES AND COMPONENTS

**AMP+ charging inlets are ready to meet the challenges of today's and tomorrow's hybrid and electric vehicles. They enable smarter, faster and safe charging for vehicles across all regions.**

Our extended AMP+ charging inlets portfolio includes AC, DC and CCS (Combined Charging System) inlets for the European, Chinese, Japanese and North American markets.

Designed for increased performance demands, they are scalable to fit all electrical/electronic architectures inside the vehicle, from discrete point-to-point operation, or via distributed intelligent control.



### Technical Features

**Poles:**

5 p

**Terminal Size / System:**

Round contact

**Conductor Cross-Sections:**

0.75 to 1.00 mm<sup>2</sup> / 4.00 mm<sup>2</sup> /  
6.00 mm<sup>2</sup>

**Voltage Rating:**

250 VDC

**Temperature Range:**

-30°C to +50°C

**Current Carrying Capability:**

32 A

**IP Rating:**

IP44 (front),

IP44 (rear)

**Cable Outlet:**

90° (can be rotated)

**Finger Protection:**

Yes

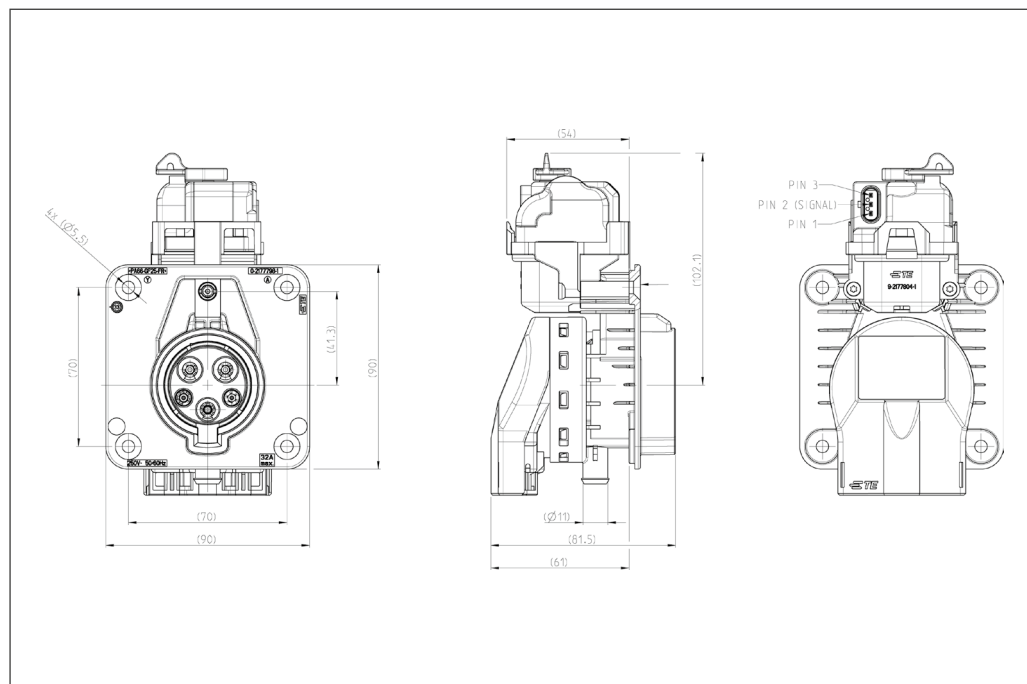
**Vibration Level:**

SG 2 (LV 215-1)

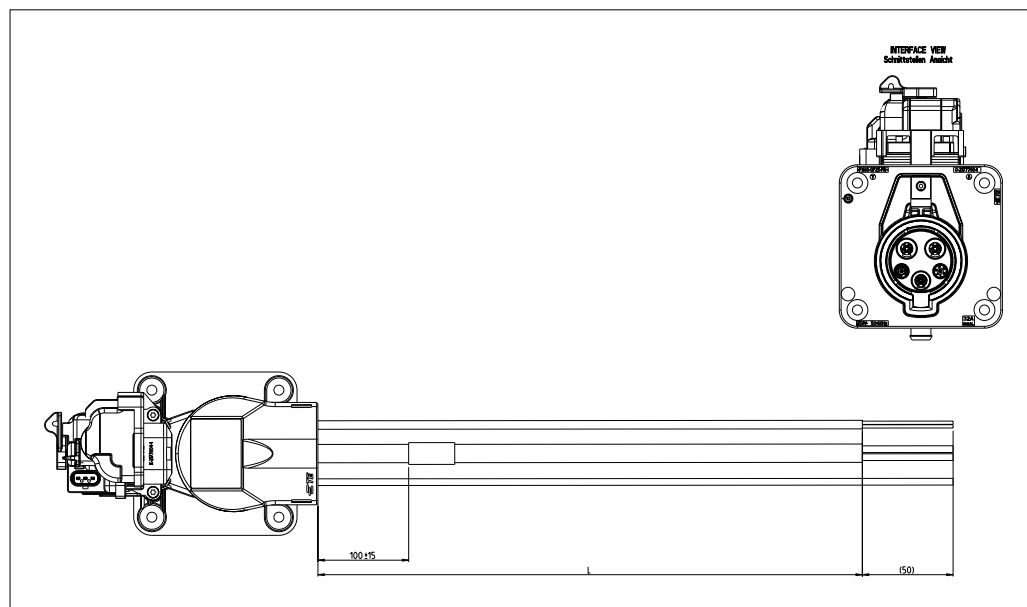
**Application Specification:**

114-94163-1

## AMP+ Charging Inlet Type 1 + Cable Assemblies



Drawing 114-94163-1 \*



Drawing for cable assembly 2208877 \* (4 mm<sup>2</sup>) and 2208876 \* (6 mm<sup>2</sup>).

Note: Cable outlet is fixed and cannot be rotated.

\* Drawing number is NOT the order number!



### Technical Features

#### Poles:

5 p / 7 p

#### Terminal Size / System:

Round contact

#### Conductor Cross-Sections:

0.75 to 1.00 mm<sup>2</sup> / 4.00 mm<sup>2</sup> /  
6.00 mm<sup>2</sup>

#### Voltage Rating:

480 VDC

#### Temperature Range:

-30°C to +50°C

#### Current Carrying Capability:

16/32 A

#### IP Rating:

IP44 (front),

IP44 (rear)

#### Cable Outlet:

90° (can be rotated)

#### Finger Protection:

Yes

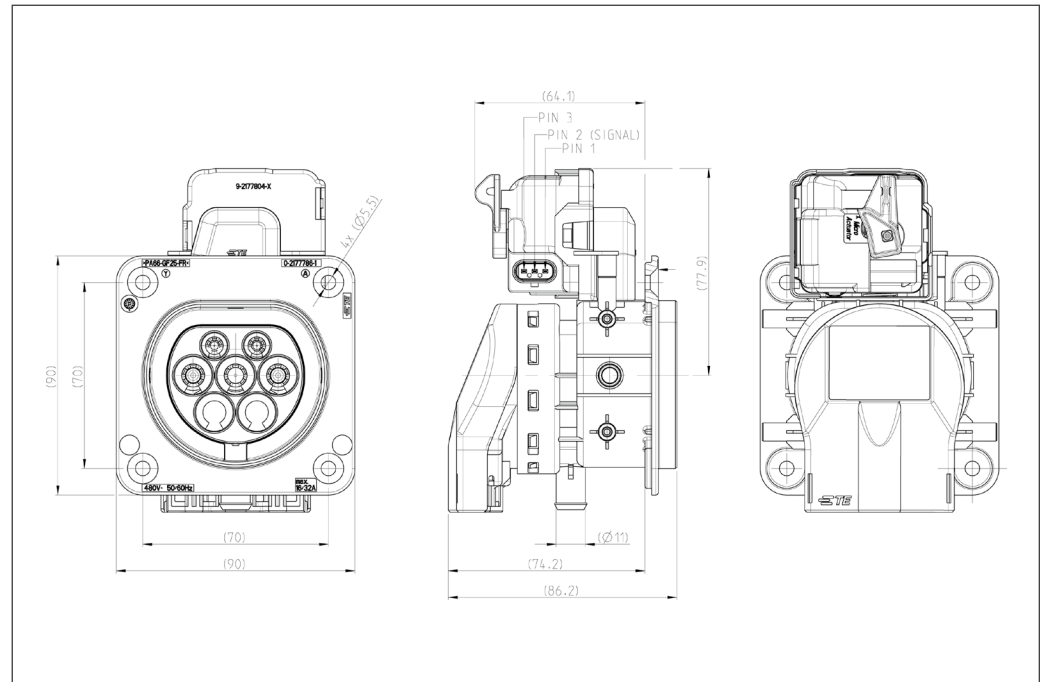
#### Vibration Level:

SG 2 (LV 215-1)

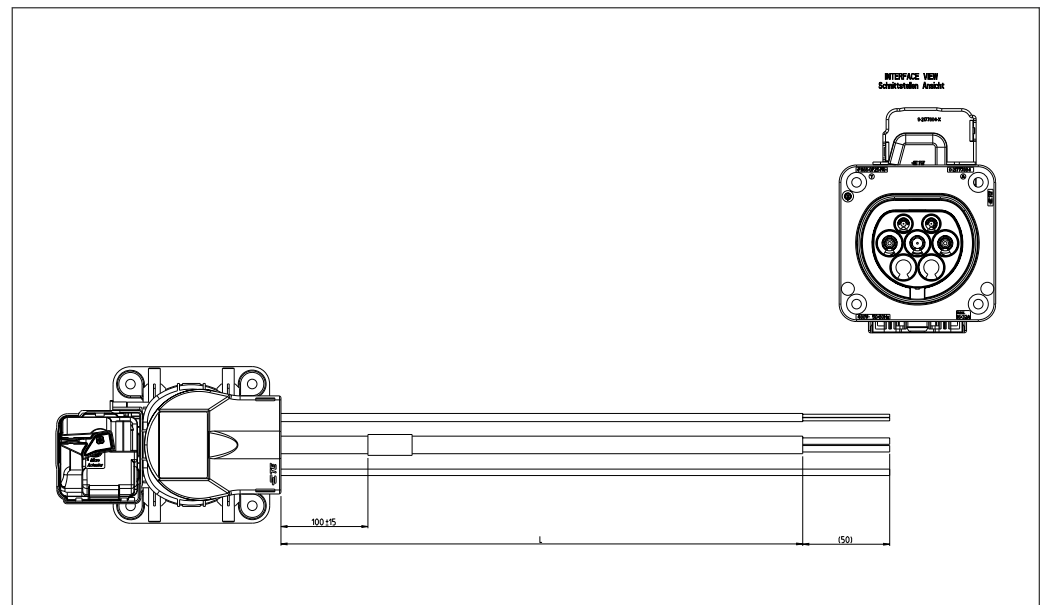
#### Application Specification:

114-94163-2

## AMP+ Charging Inlet Type 2 + Cable Assemblies



Drawing 114-94163-2 \*



Drawing for cable assembly 2208885 \* (4 mm<sup>2</sup>) and 2208884 \* (6 mm<sup>2</sup>) + 2344189 (3 phase).

Note: Cable outlet is fixed and cannot be rotated.

\* Drawing number is NOT the order number!



### Technical Features

**Poles:**

5 p / 7 p

**Terminal Size / System:**

Round contact

**Conductor Cross-Sections:**

0.75 to 1.00 mm<sup>2</sup> / 4.00 mm<sup>2</sup> /  
6.00 mm<sup>2</sup>

**Voltage Rating:**

440 VDC

**Temperature Range:**

-30 °C to +50 °C

**Current Carrying Capability:**

16/32 A

**IP Rating:**

IP44 (front),

IP44 (rear)

**Cable Outlet:**

90° (can be rotated)

**Finger Protection:**

Yes

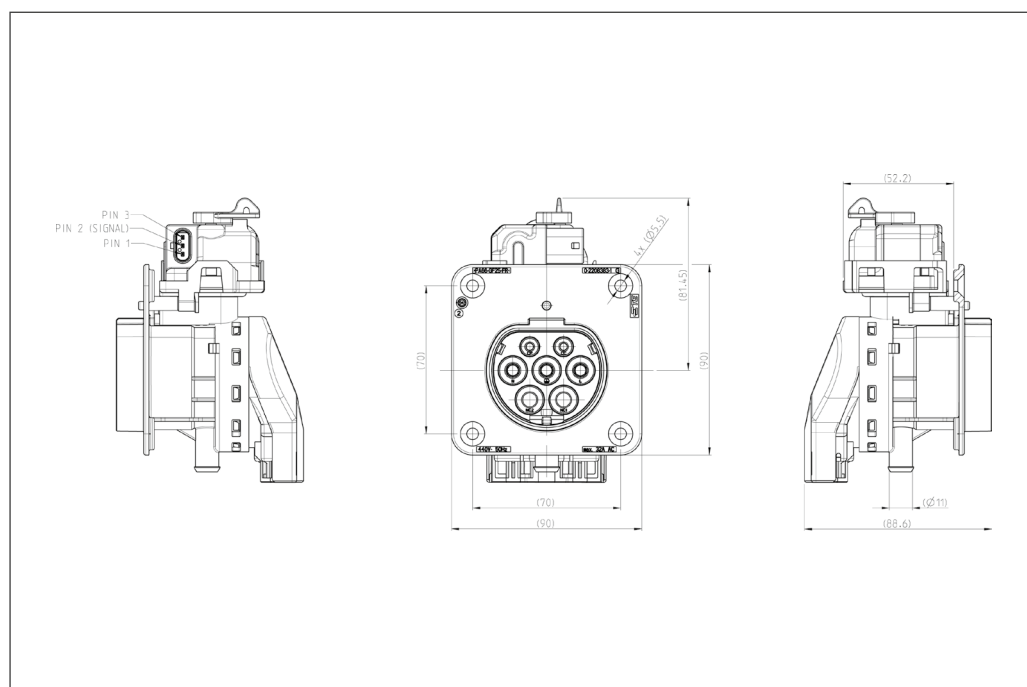
**Vibration Level:**

SG 2 (LV 215-1)

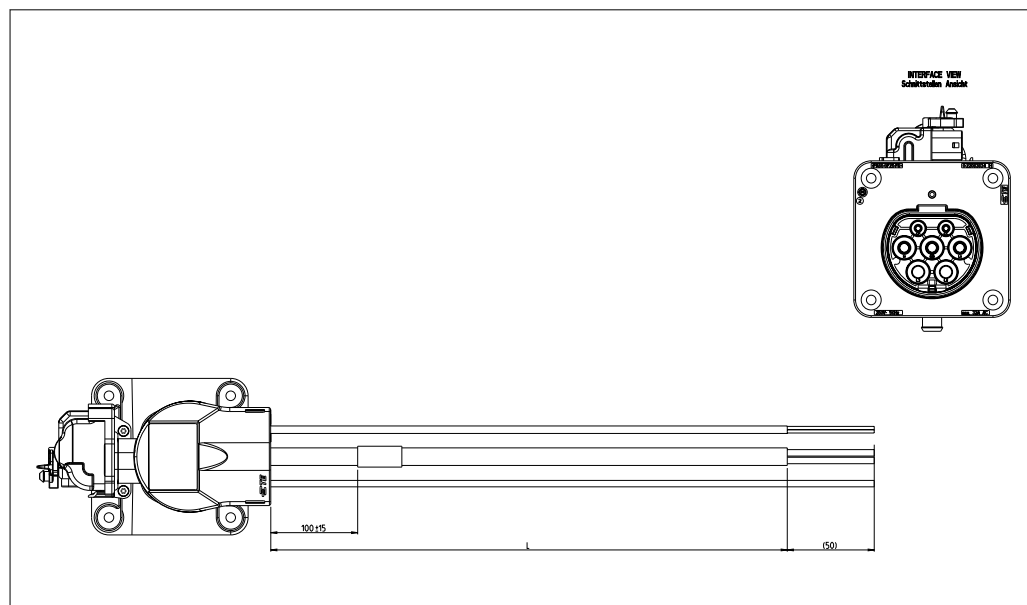
**Application Specification:**

114-94212

## AMP+ Charging Inlet Type GB + Cable Assemblies



Drawing 114-94212 \*



Drawing for cable assembly 2208882 \* (4 mm<sup>2</sup>) and 2208881 \* (6 mm<sup>2</sup>).

Note: Cable outlet is fixed and cannot be rotated.

\* Drawing number is NOT the order number!



### Technical Features

**Poles:**

5 p

**Terminal Size / System:**

Round contact

**AC Contacts:**

6 mm<sup>2</sup>

**DC Contacts:**

50 mm<sup>2</sup>

**Voltage Rating AC:**

250 VAC

**Voltage Rating DC:**

600 VDC

**Temperature Range:**

-30°C to +50°C

**Current Carrying Capability:**

32 A

**IP Rating, Mated:**

IP44

Cable outlet backside IP67

**Cable Outlet:**

90° and 180°

**Finger Protection:**

Yes

**Vibration Level:**

SG 2 (LV 215-1)

**Application Specification:**

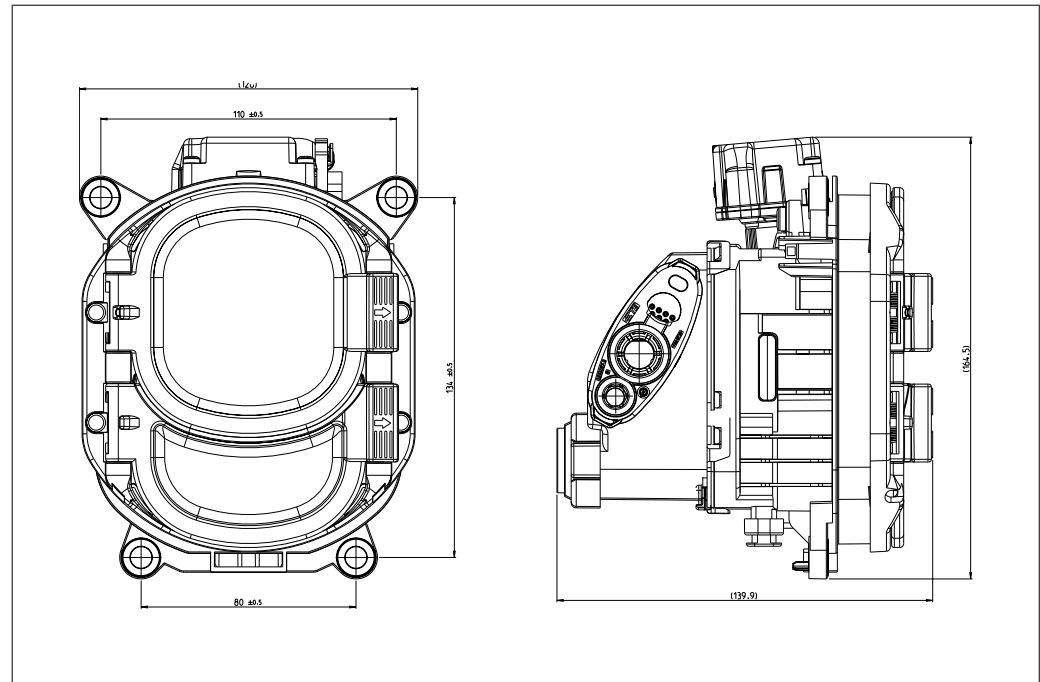
114-94648 (90°)

114-94649 (180°)

**Product Specification:**

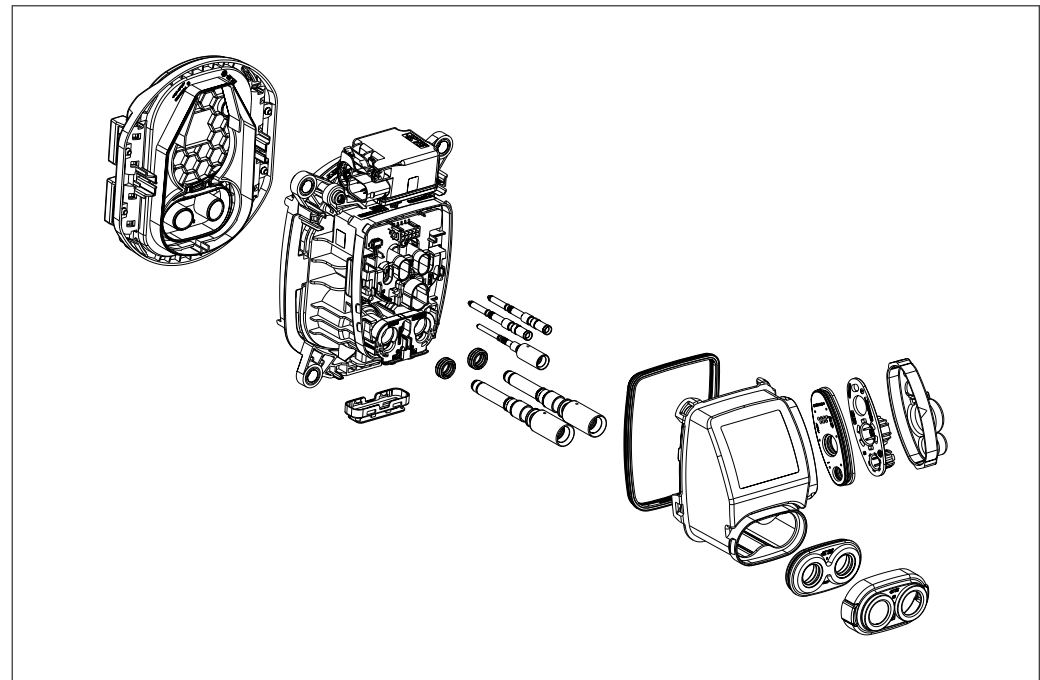
108-94777

## AMP+ Charging Inlet, Type 1, Combined Charging System (CCS 1)



Drawing [2337006](#) \*

Drawing includes all required parts to order a complete charging inlet.



\* Drawing number is NOT the order number!



### Technical Features

**Poles:**

5 p / 7 p

**Terminal Size / System:**

Round contact

**AC Contacts:**

6 mm<sup>2</sup>

**DC Contacts:**

50 mm<sup>2</sup>

**Voltage Rating AC:**

up to 480 VAC

**Voltage Rating DC:**

up to 1,000 VDC

**Temperature Range:**

-30°C to +50°C

**Current Carrying Capability:**

32 A

**IP Rating, Mated:**

IP44

Cable outlet backside IP67

**Cable Outlet:**

90° and 180°

**Finger Protection:**

Yes

**Vibration Level:**

SG 2 (LV 215-1)

**Application Specification:**

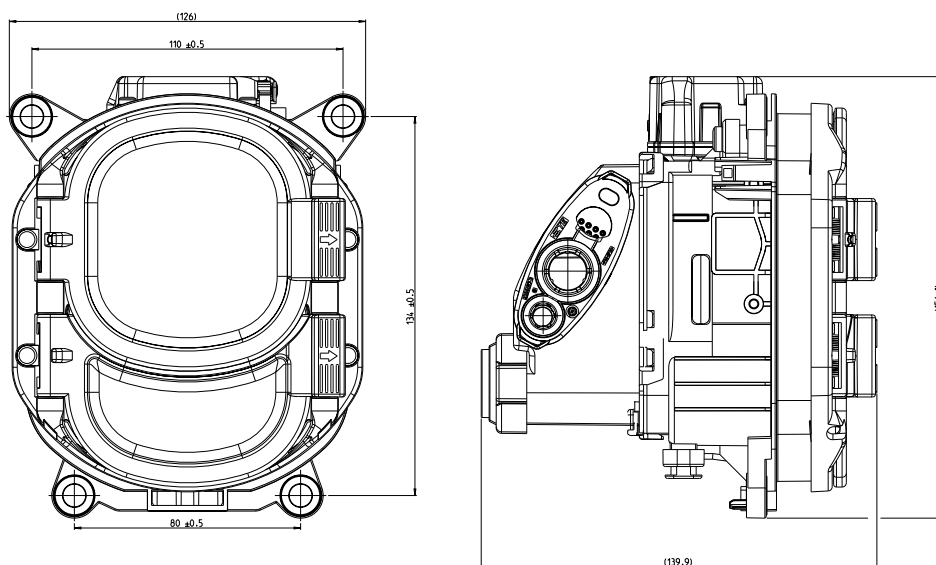
114-94650 (90°)

114-94651 (180°)

**Product Specification:**

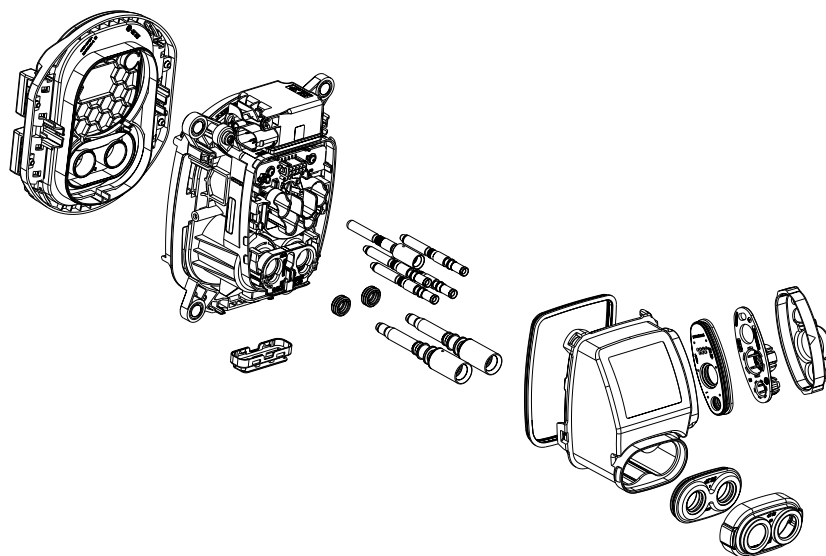
108-94778

## AMP+ Charging Inlet, Type 2, Combined Charging System (CCS 2)



Drawing 2337016 \*

Drawing includes all required parts to order a complete charging inlet.



\* Drawing number is NOT the order number!



### Technical Features

**Poles:**

5 p

**Terminal Size / System:**

Round contact

**Conductor Cross-Sections:**

0.75 to 1.00 mm<sup>2</sup> / 4.00 mm<sup>2</sup> /  
6.00 mm<sup>2</sup>

**Voltage Rating:**

250 VDC

**Temperature Range:**

-30°C to +50°C

**Current Carrying Capability:**

32 A

**IP Rating, Mated:**

IP44

Cable outlet backside IP67

**Cable Outlet:**

90° (can be rotated)

**Finger Protection:**

Yes

**Vibration Level:**

SG 2 (LV 215-1)

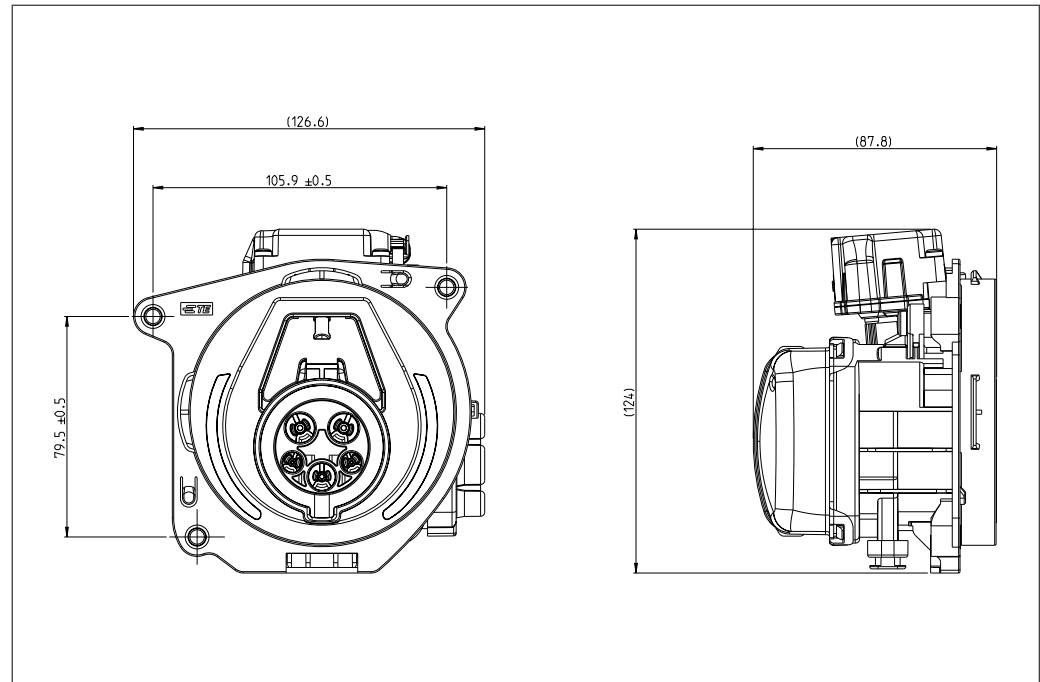
**Application Specification:**

114-94652

**Product Specification:**

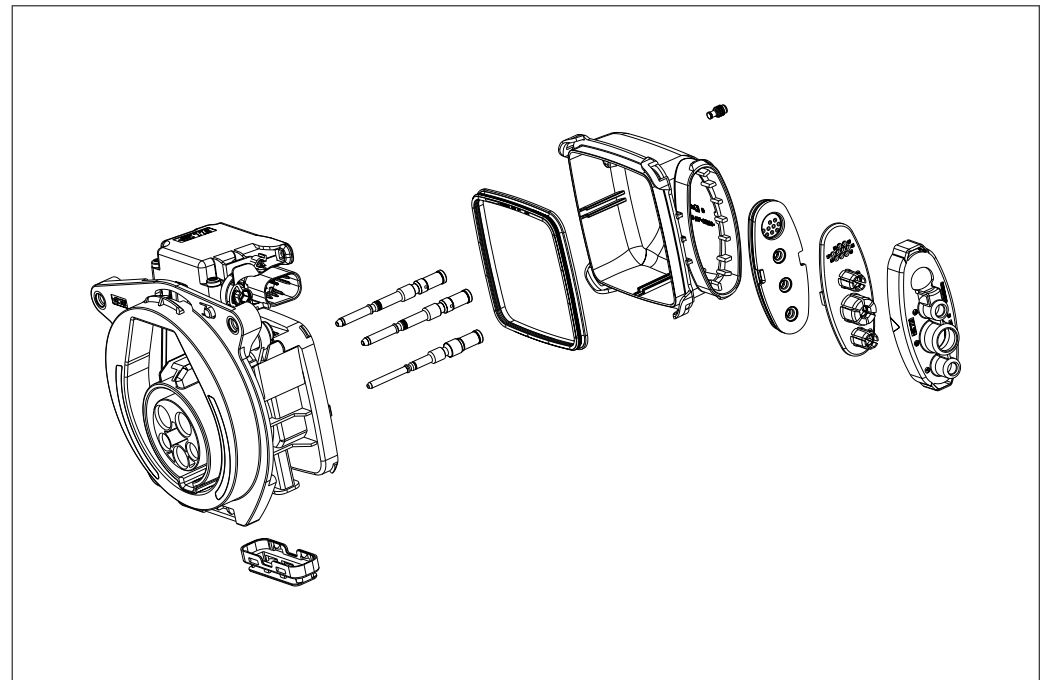
108-94779

## AMP+ Charging Inlet, Type 1, AC



Drawing 2368475 \*

Drawing includes all required parts to order a complete charging inlet.



\* Drawing number is NOT the order number!





### Technical Features

**Poles:**

5 p / 7 p

**Terminal Size / System:**

Round contact

**Conductor Cross-Sections:**

0.75 to 1.00 mm<sup>2</sup> / 4.00 mm<sup>2</sup> /  
6.00 mm<sup>2</sup>

**Voltage Rating:**

up to 480 VDC

**Temperature Range:**

-30°C to +50°C

**Current Carrying Capability:**

32 A

**IP Rating, Mated:**

IP44

Cable outlet backside IP67

**Cable Outlet:**

90° left, right and downwards

**Finger Protection:**

Yes

**Vibration Level:**

SG 2 (LV 215-1)

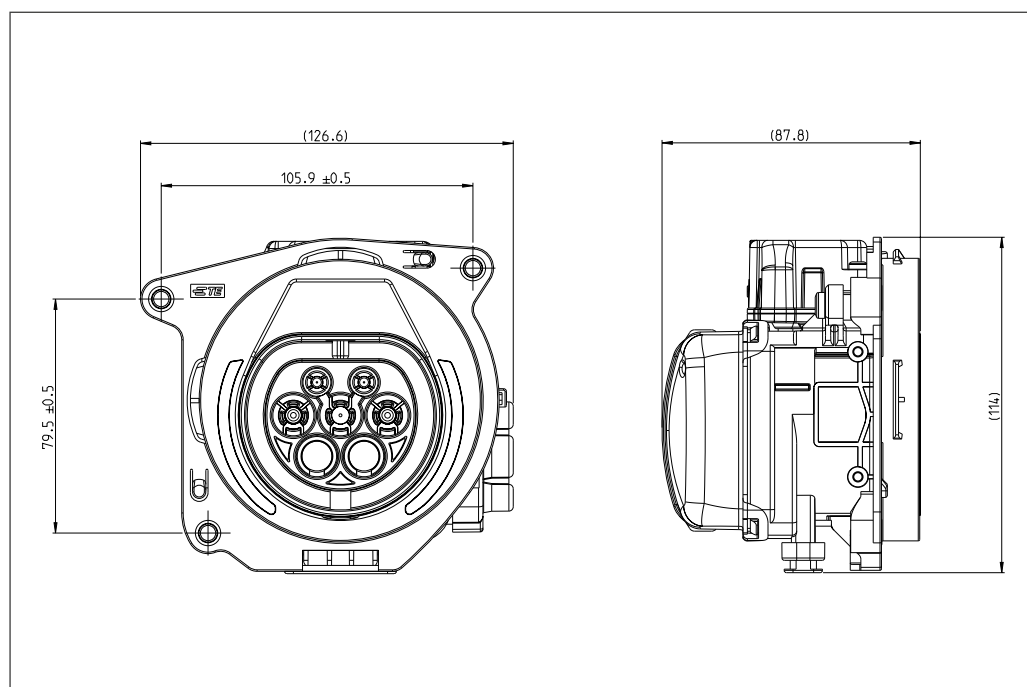
**Application Specification:**

114-94653

**Product Specification:**

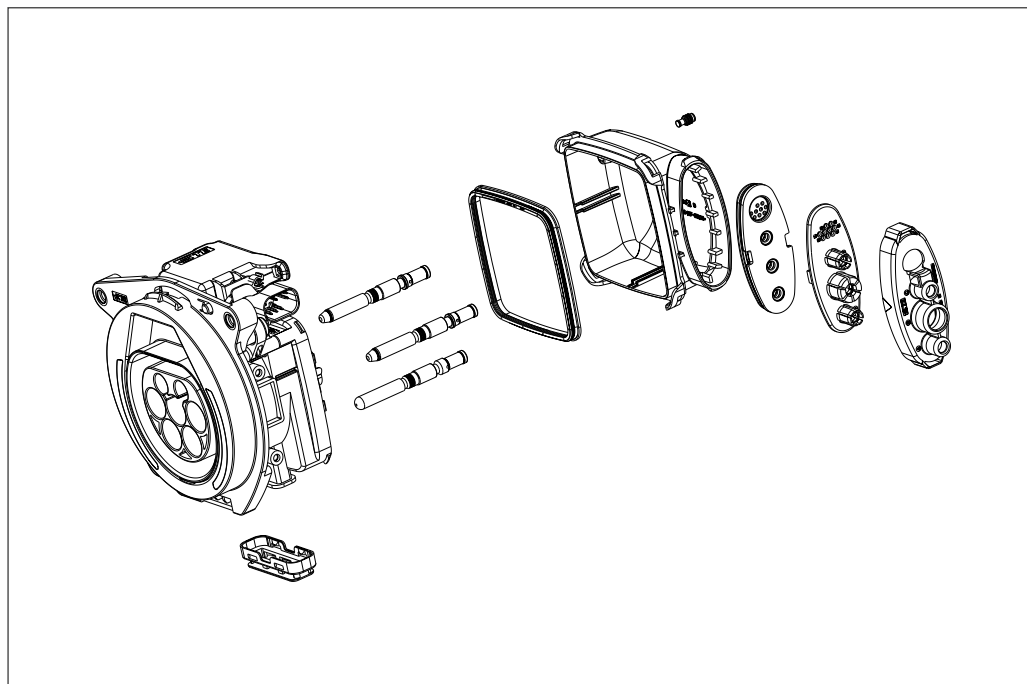
108-94780

## AMP+ Charging Inlet, Type 2, AC



Drawing 2368472 \*

Drawing includes all required parts to order a complete charging inlet.



\* Drawing number is NOT the order number!



### Technical Features

**Poles:**

5 p

**Terminal Size / System:**

Round contact

**Conductor Cross-Sections:**

0.75 to 1.00 mm<sup>2</sup> / 4.00 mm<sup>2</sup> /  
6.00 mm<sup>2</sup>

**Voltage Rating:**

250 VDC

**Temperature Range:**

-30°C to +50°C

**Current Carrying Capability:**

32 A

**IP Rating, Mated:**

IP44

Cable outlet backside IP67

**Cable Outlet:**

90° (can be rotated)

**Finger Protection:**

Yes

**Vibration Level:**

SG 2 (LV 215-1)

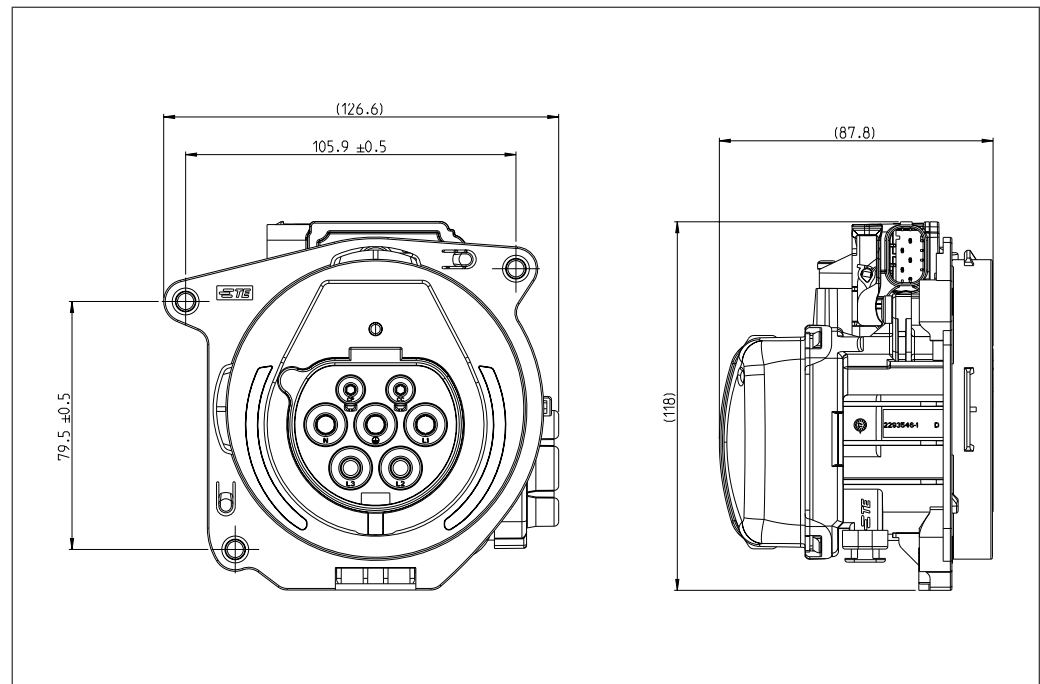
**Application Specification:**

114-94654

**Product Specification:**

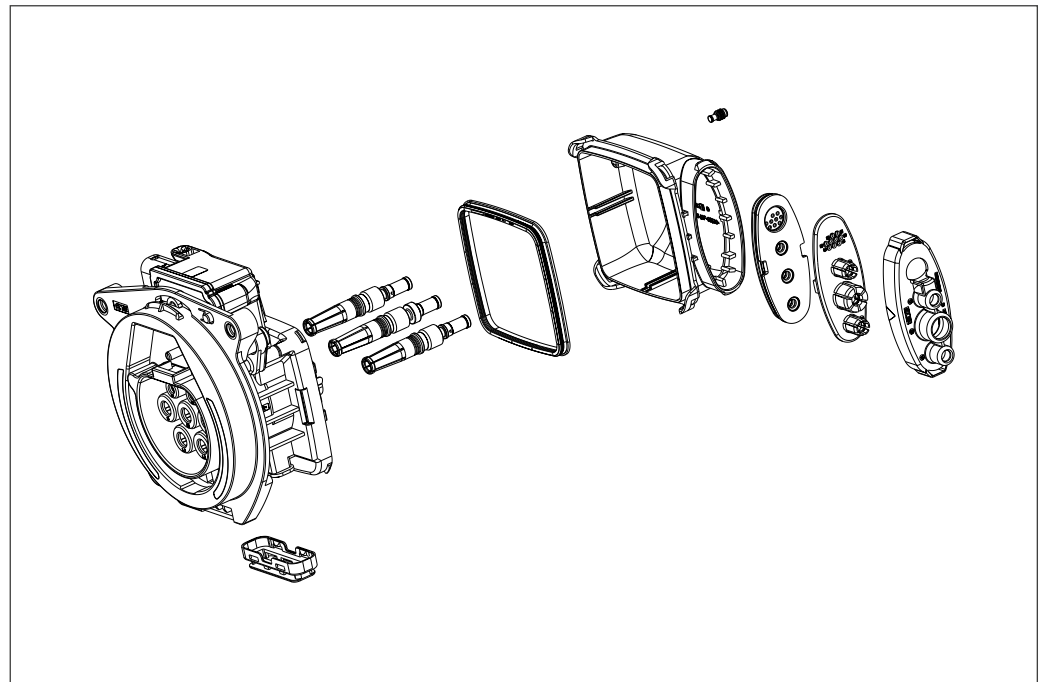
108-94781

## AMP+ Charging Inlet, Type GB, AC



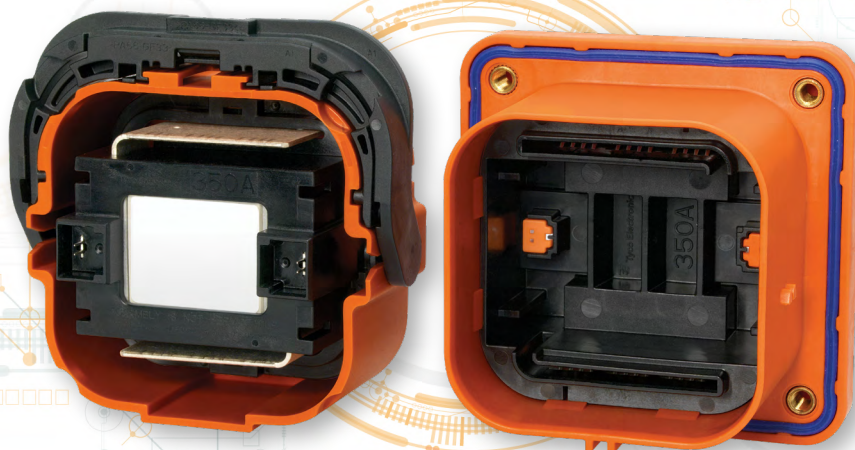
Drawing 2368478 \*

Drawing includes all required parts to order a complete charging inlet.



\* Drawing number is NOT the order number!





## AMP+ MANUAL SERVICE DISCONNECT

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.



### Technical Features

**Fuse Rating:**

Up to 630 A

**Voltage Rating:**

450 VDC (with fuse)

1,000 VDC (Shunt)

**Temperature Range:**

-40°C to 65°C

**Storage Temperature:**

-40°C to 85°C

**IP Rating:**

Mated: IPx7, IP6k9k

Unmated: IP2xb

**HV Interlock Option:**

2x integrated, internal

**Current Rating:**

Based on fuse selection

**Standards and Specifications:**

USCAR-2

USCAR-37

IEC 60529

RoHS

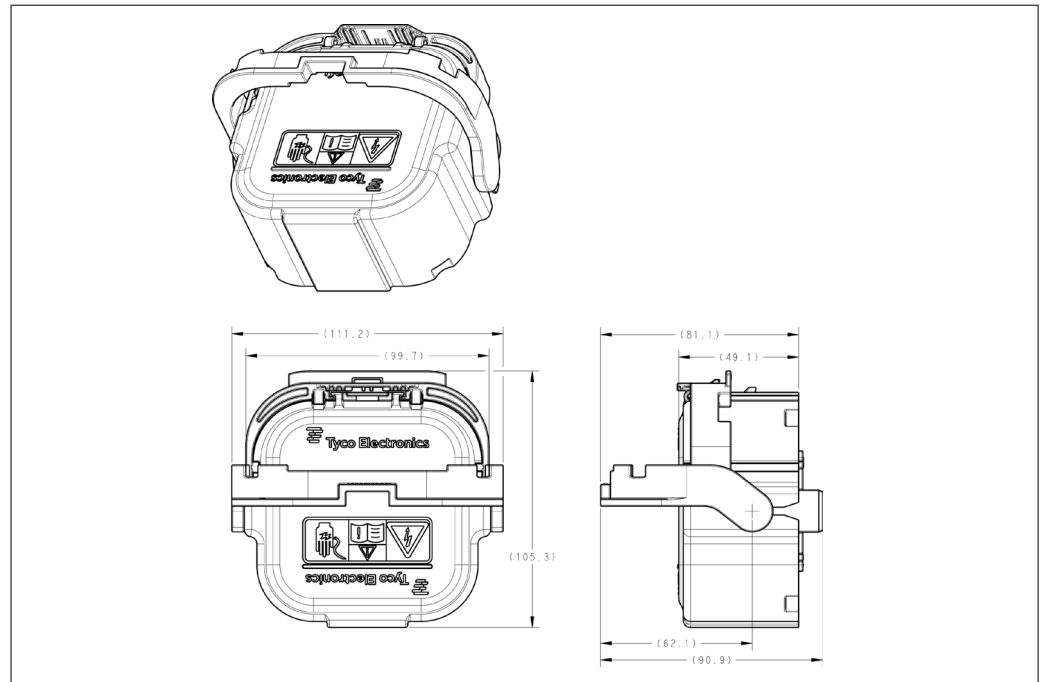
**Product Specification:**

108-127000

**Application Specification:**

408-10432

## AMP+ Manual Service Disconnect – Plug



Drawing 2103172 \*

| Fuse Rating | Order Information             |
|-------------|-------------------------------|
| 200A        | To be ordered<br>see drawing! |
| 250A        |                               |
| 350A        |                               |
| 630A        |                               |
| Shunt       |                               |

\* Drawing number is NOT the order number!



### Technical Features

**Fuse Rating:**

Up to 630 A

**Voltage Rating:**

450 VDC (with fuse)

1,000 VDC (Shunt)

**Temperature Range:**

-40°C to 65°C

**Storage Temperature:**

-40°C to 85°C

**IP Rating:**

Mated: IPx7, IP6k9k

Unmated: IP2xb

**HV Interlock Option:**

2x integrated, internal

**Current Rating:**

Based on fuse selection

**Standards and Specifications:**

USCAR-2

USCAR-37

IEC 60529

RoHS

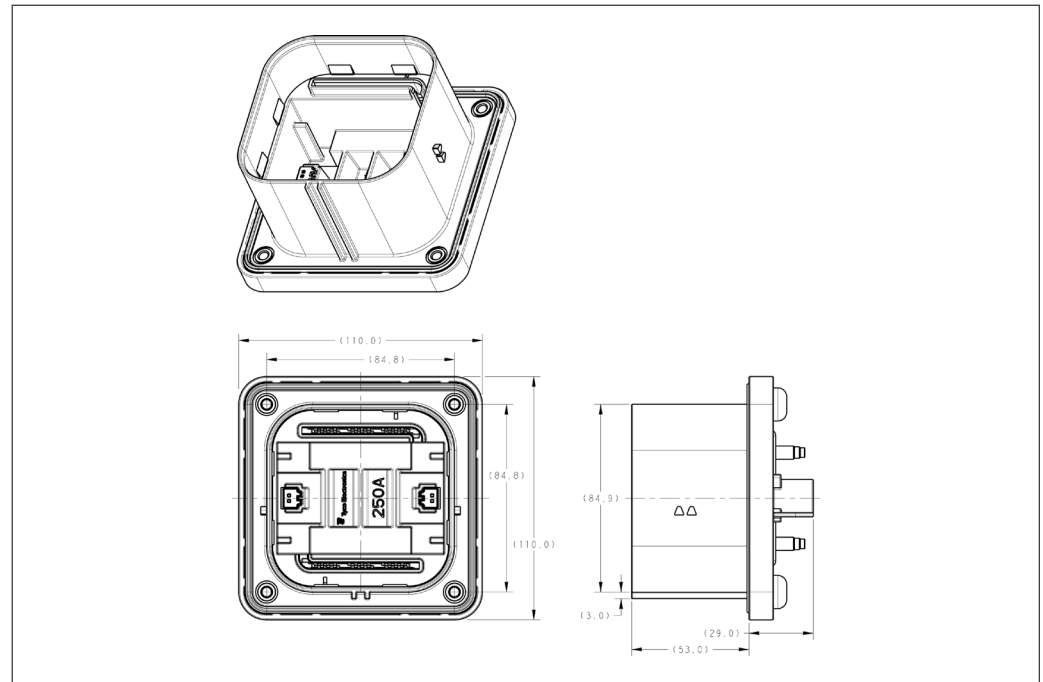
**Product Specifications:**

108-127000

**Application Specifications:**

408-10377

## AMP+ Manual Service Disconnect – Receptacle



Drawing 1587987 \*

| Order Information |               |
|-------------------|---------------|
| Receptacle        | To be ordered |
| Housing           | see drawing!  |

\* Drawing number is NOT the order number!



### Technical Features

**Fuse Rating:**

Up to 630 A

**Voltage Rating:**

750 VDC (with fuse)

1,000 VDC (shunt)

**Operation Temperature:**

-40°C to +65°C

**Storage Temperature:**

-40°C to +85°C

**IP Rating:**

Mated: IPx7, IP6k9k

Unmated: IP2xb

**Flammability Grade:**

V0

Unmated: IP2xb

**HV Interlock Option:**

2x integrated, internal

**Current Rating:**

Based on fuse selection

**Standards and Specifications:**

USCAR-2

USCAR-25

USCAR-37

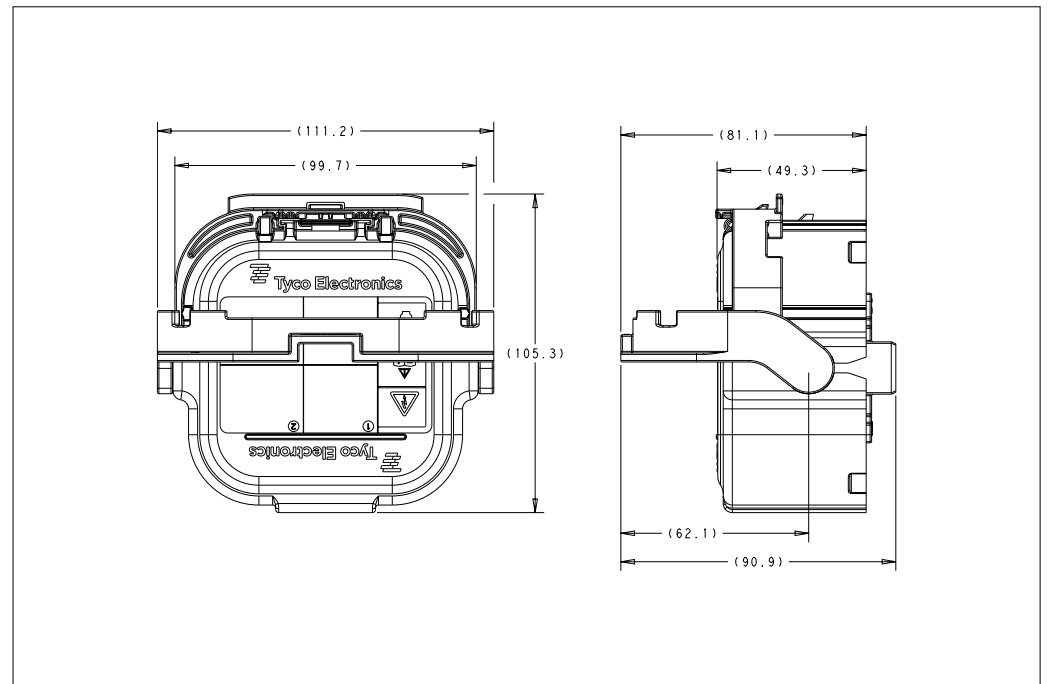
**Product Specification:**

108-101601

**Application Specification:**

408-101003

## AMP+ Manual Service Disconnect – Plug for ICT Applications



Drawing 2315856 \*

| Fuse Rating | Part Number |
|-------------|-------------|
| 630A        | 2315856-6   |
| 500A        | 2315856-5   |
| 450A        | 2315856-4   |
| 350A        | 2315856-3   |

\* Drawing number is NOT the order number!





#### Technical Features

##### Fuse Rating:

Up to 630 A

##### Voltage Rating:

750 VDC (with fuse)

1,000 VDC (Shunt)

##### Operation Temperature:

-40°C to +65°C

##### Storage Temperature:

-40°C to +85°C

##### IP Rating:

Mated: IPx7, IP6k9k

Unmated: IP2xb

##### Flammability Grade:

V0

Unmated: IP2xb

##### HV Interlock Option:

2x integrated, internal

##### Current Rating:

Based on fuse selection

##### Standards and Specifications:

USCAR-2

USCAR-25

USCAR-37

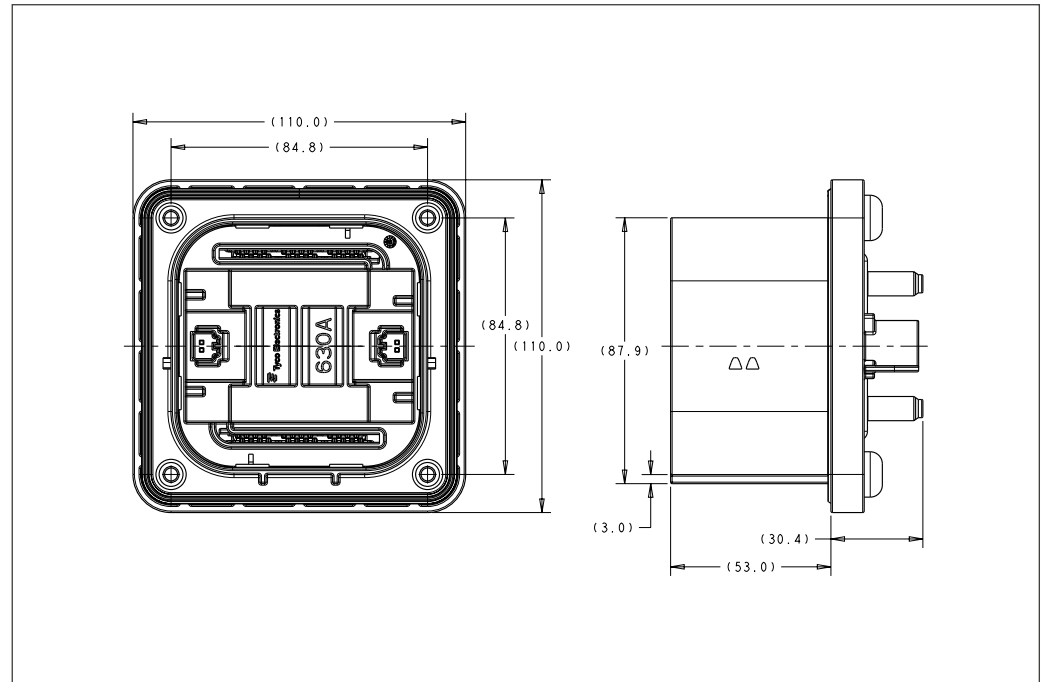
##### Product Specification:

108-101601

##### Application Specification:

408-101004

## AMP+ Manual Service Disconnect – Receptacle for ICT Applications



Drawing 2315855 \*

| Part Description                | Part Number |
|---------------------------------|-------------|
| M8 threaded stud; Marking 630 A | 2315855-6   |
| M8 threaded stud; Marking 500 A | 2315855-5   |
| M8 threaded stud; Marking 450 A | 2315855-4   |
| M8 threaded stud; Marking 350 A | 2315855-3   |

\* Drawing number is NOT the order number!





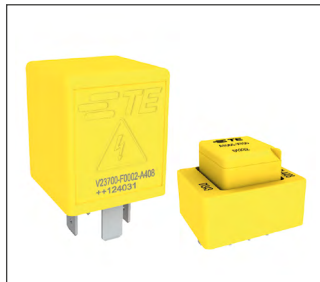
## HIGH-VOLTAGE RELAYS & CONTACTORS

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

Our high-voltage product portfolio is steadily growing and has been completed by a high performing plug-in version: the EVC 80 main contactor. With our EVC 175, EVC 250 and EVC 250-800 main contactors an extensive choice of new generation high-voltage contactors is now available.

Alongside TE's proven EVC 135 and EVC 500 hermetically sealed contactors stand for fast and reliable current switching. Completing the range, our Mini K HV pre-charge relays feature a cost-effective, safe and light-weight solution for DC high-voltage power systems.

All our high-voltage relays and contactors meet the demanding switching requirements of hybrid and electric vehicles.



### 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
- Plug-in and PCB version available
- 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 <sup>1)</sup>

**Limiting making / breaking current:**  
20 A >105 ops. / 20 A >10 ops. <sup>2)</sup>

**Operate / release time typ.:**  
2.5 ms / 1 ms

### Coil Data

**Rated coil voltage**  
12 VDC <sup>1)</sup>

**Rated coil power (+23°C):**  
PCB: 2.9 W / Plug-in: 3.5 W <sup>1)</sup>

**Coil resistance (+23°C):**  
PCB: 50 Ω / Plug-in: 41.6 Ω

### Other Data

**Temperature range:**  
-40°C to +85°C

**Category and degree of protection:**  
RT II – Flux proof

**Terminal type and mounting:**  
PCB and plug-in/QC

### Dimensions LxWxH (approx.):

PCB: 25.5 x 20.7 x 19.3 mm,  
(1.0 x 0.8 x 0.8")

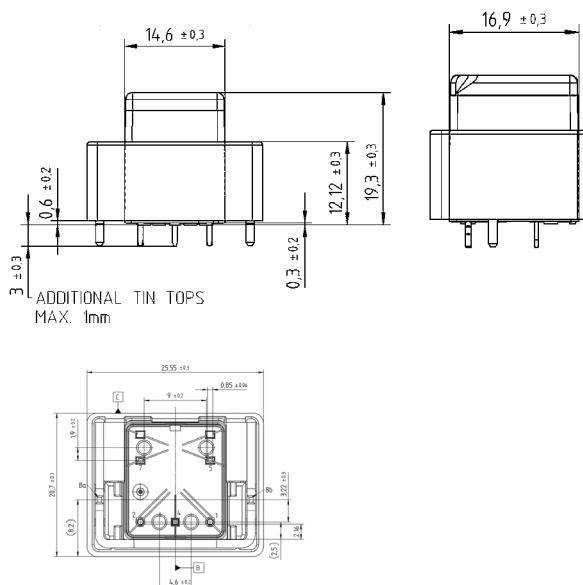
Plug-in: 29.9 x 29.9 x 34.7 mm,  
(1.2 x 1.2 x 1.4") w/o terminals

### Weight (approx.):

PCB: 17 g (0.6 oz)  
Plug-in: 39 g (1.4 oz)

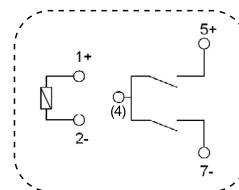
## Mini K HV Precharge Relays

### Dimensions PCB Version

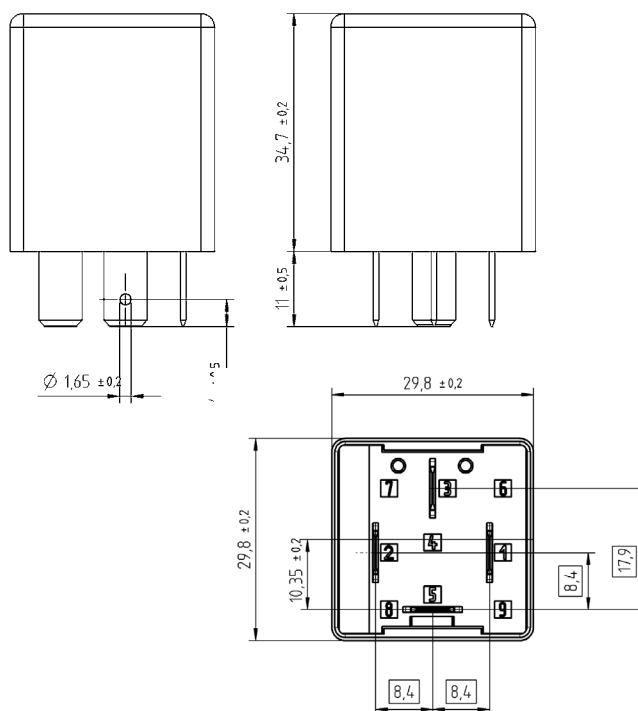


### Terminal Assignment

1 form X (NO DM)

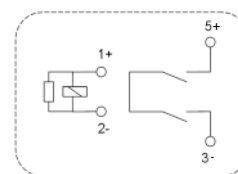


### Dimensions Plug-in Version



### Terminal Assignment

1 form X (NO DM)  
with resistor



## Ordering Information Mini K HV precharge Relays

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

<sup>1)</sup> Max. coil current is limited and depends on operating conditions. Consult TE Connectivity for details.

<sup>2)</sup> Min. 10 fault break operations.



### Key Features

- Continuous current 80 A at 85°C
- Suitable for voltage levels up to 450 VDC
- Short circuit carry capability 900 A

### Typical Applications

- DC high voltage high current applications
- Main contactors for hybrid and auxiliary contactor for 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:**

80 A

**Limiting make or break current:**

32 A / 32 A, 450 V (>5,000 ops.)  
80 A, 10 V / 2 A, 420 V (>75,000 ops.)

**Short term current rating:**

(6 min) 150 A

**Short circuit carry current:**

(25 ms) 2000 A

**Operate / release time max.:**

25 / 10 ms at 12 VDC (coil voltage)

### Coil Data

**Rated coil voltage:**

12 VDC

**Rated coil power (+23°C):**

6.7 W

**Coil resistance (+23°C):**

21.4 Ω

### Other Data

**Temperature range:**

-40°C to +85°C

**Category and degree of protection:**

Hermetically sealed

**Terminal type and mounting:**

Plug-in/QC

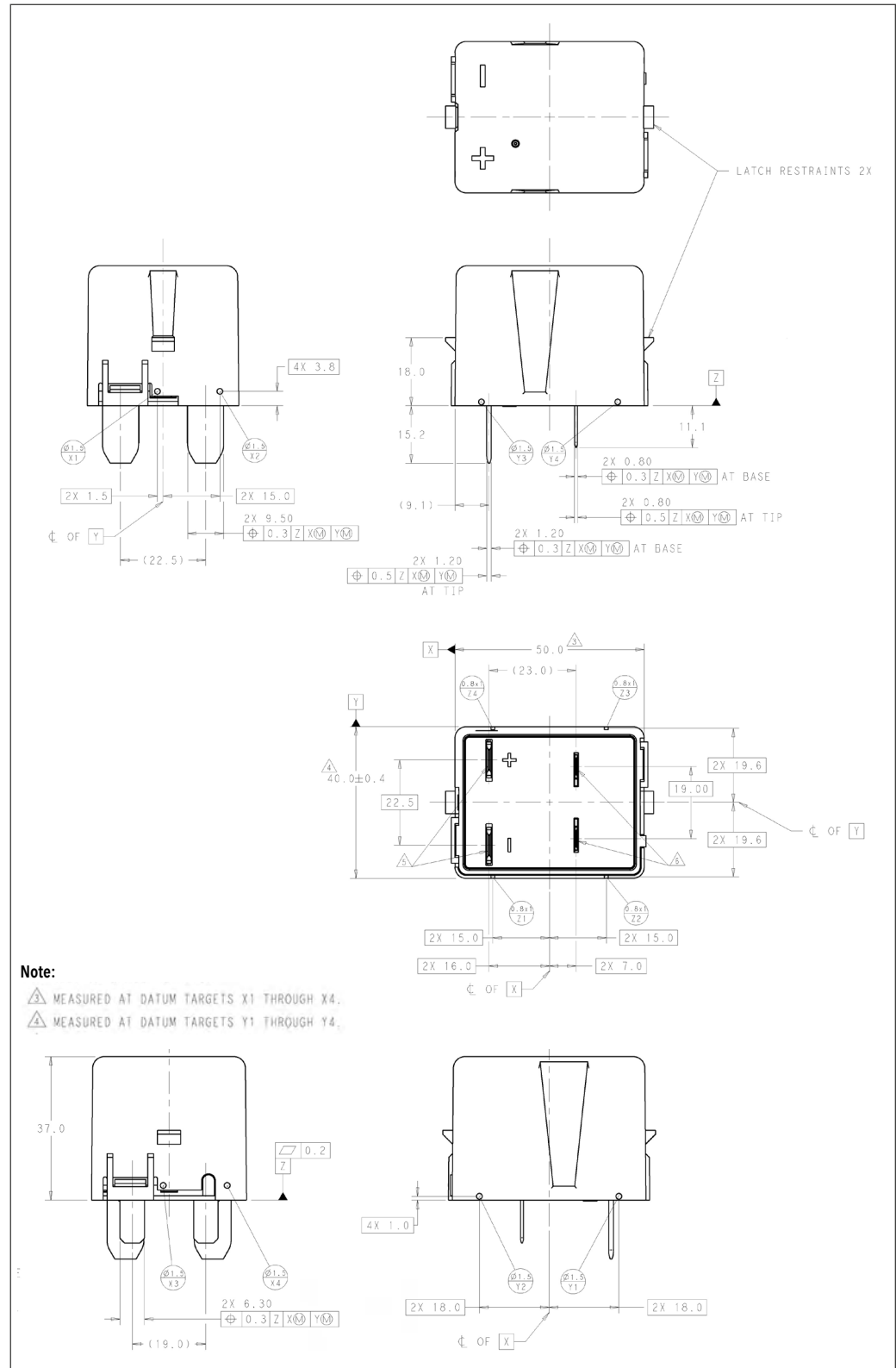
**Dimensions LxWxH (approx.):**

50.0 x 40.0 x 37.0 mm  
(2.0 x 1.6 x 1.5")

**Weight (approx.):**

150 g (5.3 oz)

## EVC 80 Main Contactor



### Ordering Information EVC 80 Main Contactor

| Product Code | Arrangement      | Coil (VDC) | Econo- mization | Rated Voltage (VDC) | Terminal Type | Mounting | Resistance | Part Number |
|--------------|------------------|------------|-----------------|---------------------|---------------|----------|------------|-------------|
| EVC 80-4ANG  | 1 form X (NO DM) | 12         | Optional        | 450                 | Plug-in       | QC       | 21.4 Ω     | 2203997-1   |



### Key Features

- Continuous current 135 A at 85°C (35 mm<sup>2</sup>)<sup>1)</sup>
- Load voltage up to 450 VDC<sup>1)</sup>
- 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<sup>2)</sup>

#### Limiting cont. current at 85°C:

135 A

#### Limiting make or break current:

50 A / 50 A (>50,000 ops.)

#### Short term current rating:

Continuous carry current

(1 min) 400 A

Breaking capability 660 A

#### Short circuit carry current:

2,000 A

#### Operate / release time typ.:

25 ms / 10 ms

### Coil Data

#### Rated coil voltage:

12 VDC, 24 VDC

#### Coil resistance (+20°C):

26 Ω, 15.3 Ω, 3.8 Ω and 96 Ω available for different pull-in voltages

### Other Data

#### Temperature range:

-40°C to +85°C

#### Category and degree of protection:

Hermetically sealed

#### Terminal type and mounting:

Stripped wires (coil) / M5 threaded inserts (load); screws

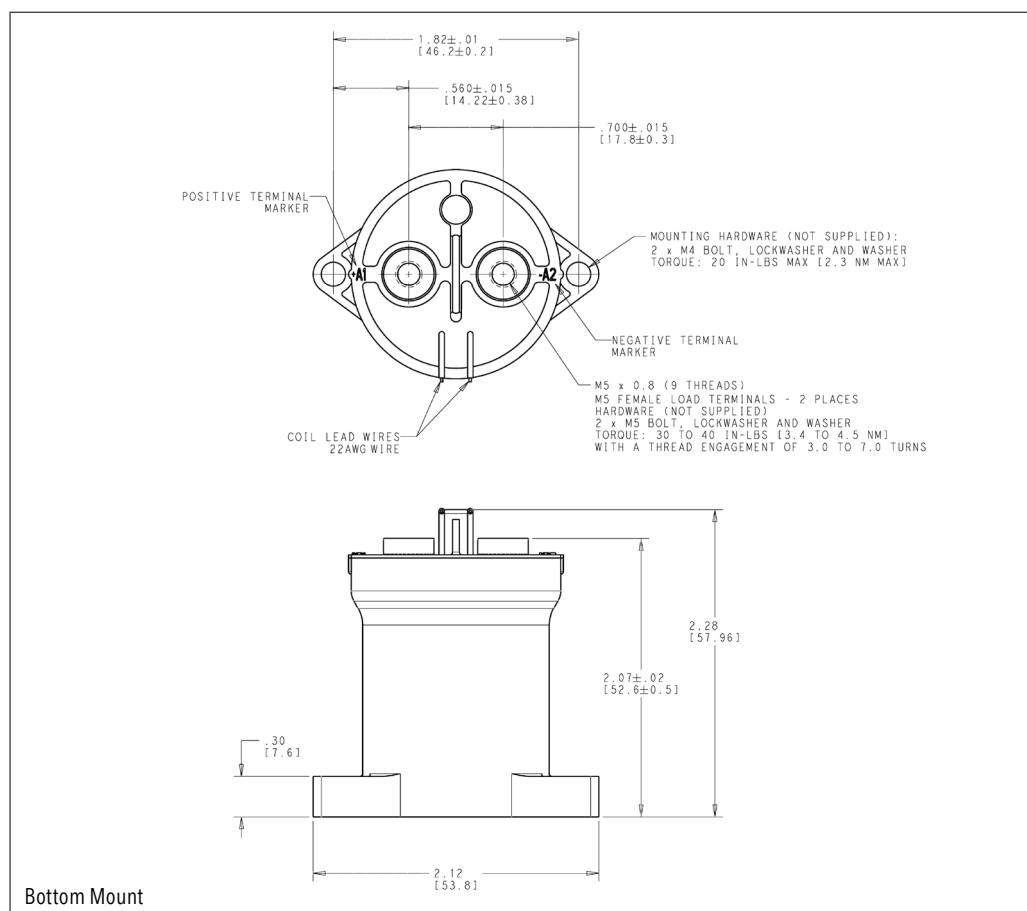
#### Dimensions LxWxH (approx.):

53.8 x 35.2 x 58 mm (2.12 x 1.38 x 2.28")

#### Weight (approx.):

180 g (6.3 oz)

## EVC 135 Contactor



### Ordering Information EVC 135 Contactor

| Product Code  | Arrangement      | Coil (VDC) | Econo-mization | Coil Suppr.              | Rated Voltage (VDC) | Terminal Type           | Mounting | Resistance | Part Number |
|---------------|------------------|------------|----------------|--------------------------|---------------------|-------------------------|----------|------------|-------------|
| EVC 135-4BNGA | 1 form X (NO DM) | 12         | Required       | On request <sup>2)</sup> | 450                 | Stripped wires / Screws | Bottom   | 15.3 Ω     | 2203194-1   |
| EVC 135-5ANGA | 1 form X (NO DM) | 12         | Optional       | On request <sup>2)</sup> | 450                 | Stripped wires / Screws | Bottom   | 26 Ω       | 2138622-1   |
| EVC 135-7BNGA | 1 form X (NO DM) | 24         | Optional       | On request <sup>2)</sup> | 450                 | Stripped wires / Screws | Bottom   | 96 Ω       | 2138602-1   |
| EVC 135-4ANHA | 1 form X (NO DM) | 12         | Required       | On request <sup>2)</sup> | 450                 | Stripped wires / Screws | Side     | 15.3 Ω     | 2272229-1   |
| EVC 135-4BNHA | 1 form X (NO DM) | 12         | Required       | On request <sup>2)</sup> | 450                 | Stripped wires / Screws | Side     | 15.3 Ω     | 2138168-1   |
| EVC 135-5BNGA | 1 form X (NO DM) | 12         | Optional       | On request <sup>2)</sup> | 450                 | Stripped wires / Screws | Bottom   | 26 Ω       | 2098371-1   |
| EVC 135-6BNGA | 1 form X (NO DM) | 12         | Required       | On request <sup>2)</sup> | 450                 | Stripped wires / Screws | Bottom   | 3.8 Ω      | 2138084-1   |

<sup>1)</sup> Higher currents possible depending on busbar size and cooling concept.

<sup>2)</sup> Consult TE Connectivity for higher voltages. For details please refer to datasheet.



### Key Features

- Continuous current 330 A at 85°C (100 mm<sup>2</sup>)<sup>1)</sup>
- Suitable for voltage levels up to 500 VDC<sup>2)</sup>
- Short circuit carry capability 5,000 A
- Mounting in any direction
- Versions with and without internal economizer

### 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<sup>2)</sup>

#### Limiting make or break current:

210 A / 10 A (>100,000 ops.)

#### Short term current rating:

500 A / 0.5 min; 1,500 A / 2 s

#### Short circuit carry current:

5,000 A / 20 ms

#### Operate / release time max.:

20 / 8 ms at 12 VDC (coil voltage)

### Coil Data

#### Rated coil voltage:

12 VDC

#### Coil resistance (+23°C):

5.0 Ω (single coil),  
3.0 / 33.0 Ω (dual coil)

### Other Data

#### Temperature range:

-40°C to +85°C

#### Category and degree of protection:

dustproof, IP 50 (upright);  
IP54<sup>3)</sup> (others)

#### Terminal type and mounting:

Connector (coil) / M6 bolts (load);  
screws

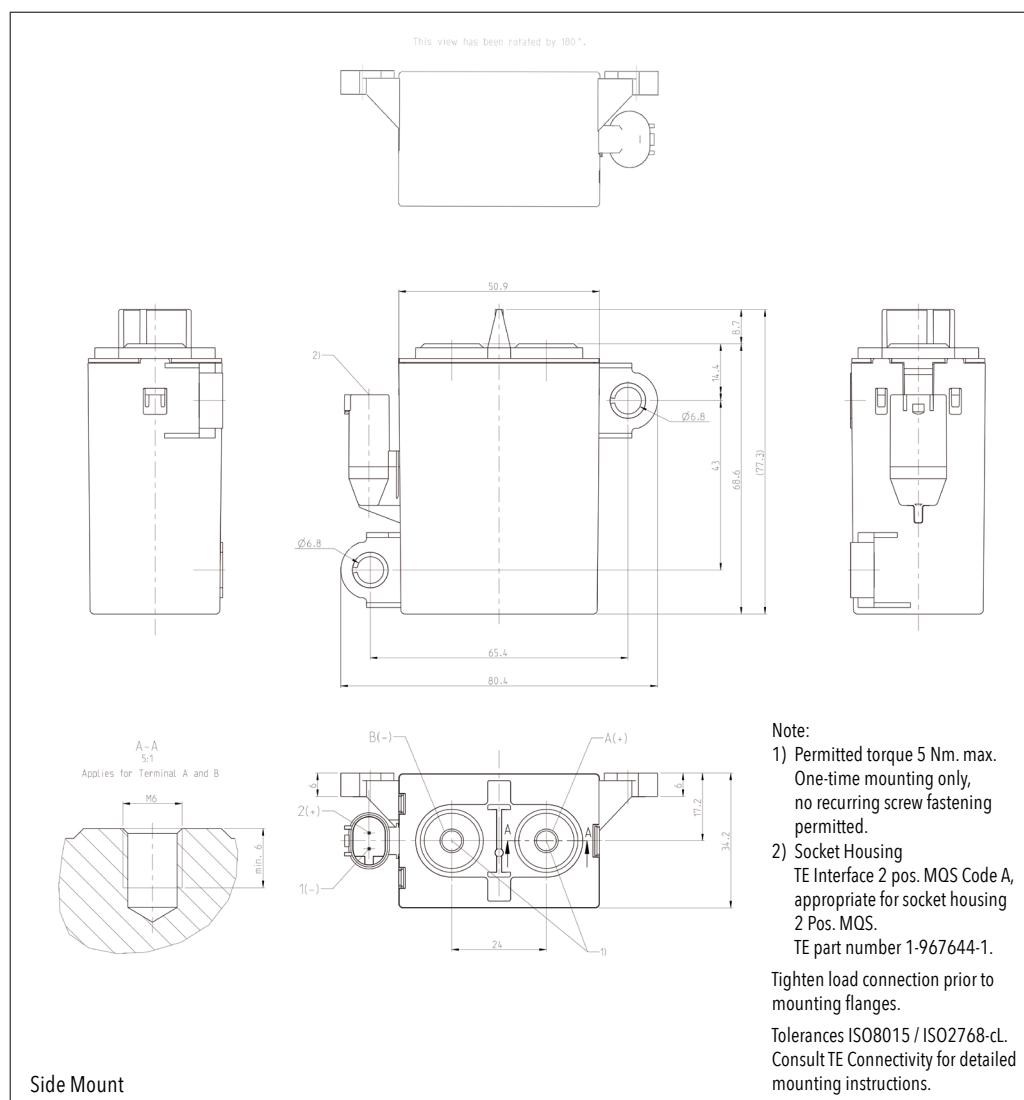
#### Dimensions LxWxH (approx.):

77.3 x 50.9 x 34.2 mm  
(3.0 x 2.0 x 1.3")

#### Weight (approx.):

295 g (10.4 oz)

## EVC 175 Main Contactor – Side Mount Version



### Ordering Information EVC 175 Main Contactor – Side Mount Version

| Product Code      | Arrangement      | Coil (VDC) | Econo-mization      | Coil Suppr.     | Rated Voltage (VDC) | Terminal Type     | Mounting | Resistance             | Part Number |
|-------------------|------------------|------------|---------------------|-----------------|---------------------|-------------------|----------|------------------------|-------------|
| V23717-A0001-A200 | 1 form X (NO DM) | 12         | External economizer | External > 36 V | 450                 | Connector/ Screws | Side     | 5.0 Ω Single coil      | 6-1904123-6 |
| V23717-A0002-A200 | 1 form X (NO DM) | 12         | Internal economizer | Internal        | 450                 | Connector/ Screws | Side     | 3.0 / 33.0 Ω Dual coil | 2-1904070-1 |

<sup>1)</sup> Higher currents possible depending on busbar size and cooling concept.

<sup>2)</sup> Consult TE Connectivity for higher voltages. For details please refer to datasheet.

<sup>3)</sup> Protection class applicable for all mounting orientations except load terminals on top.





### Key Features

- Continuous current 330 A at 85°C (100 mm<sup>2</sup>)<sup>1)</sup>
- Suitable for voltage levels up to 500 VDC<sup>2)</sup>
- Short circuit carry capability 5,000 A
- Mounting in any direction
- Versions with and without internal economizer

### 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<sup>1)</sup>

#### Limiting cont. current at 85°C:

175 A

#### Limiting make or break current:

210 A / 10 A (>100,000 ops.)

#### Short term current rating:

500 A / 0.5 min; 1,500 A / 2 s

#### Short circuit carry current:

5,000 A / 20 ms

#### Operate / release time max.:

20 / 8 ms at 12 VDC (coil voltage)

### Coil Data

#### Rated coil voltage:

12 VDC

#### Coil resistance (+23°C):

5.0 Ω (single coil),  
3.0 / 33.0 Ω (dual coil)

### Other Data

#### Temperature range:

-40°C to +85°C

#### Category and degree

##### of protection:

dustproof, IP 50 (upright);  
IP54<sup>3)</sup> (others)

#### Terminal type and mounting:

Connector (coil) / M6 bolts (load);  
screws

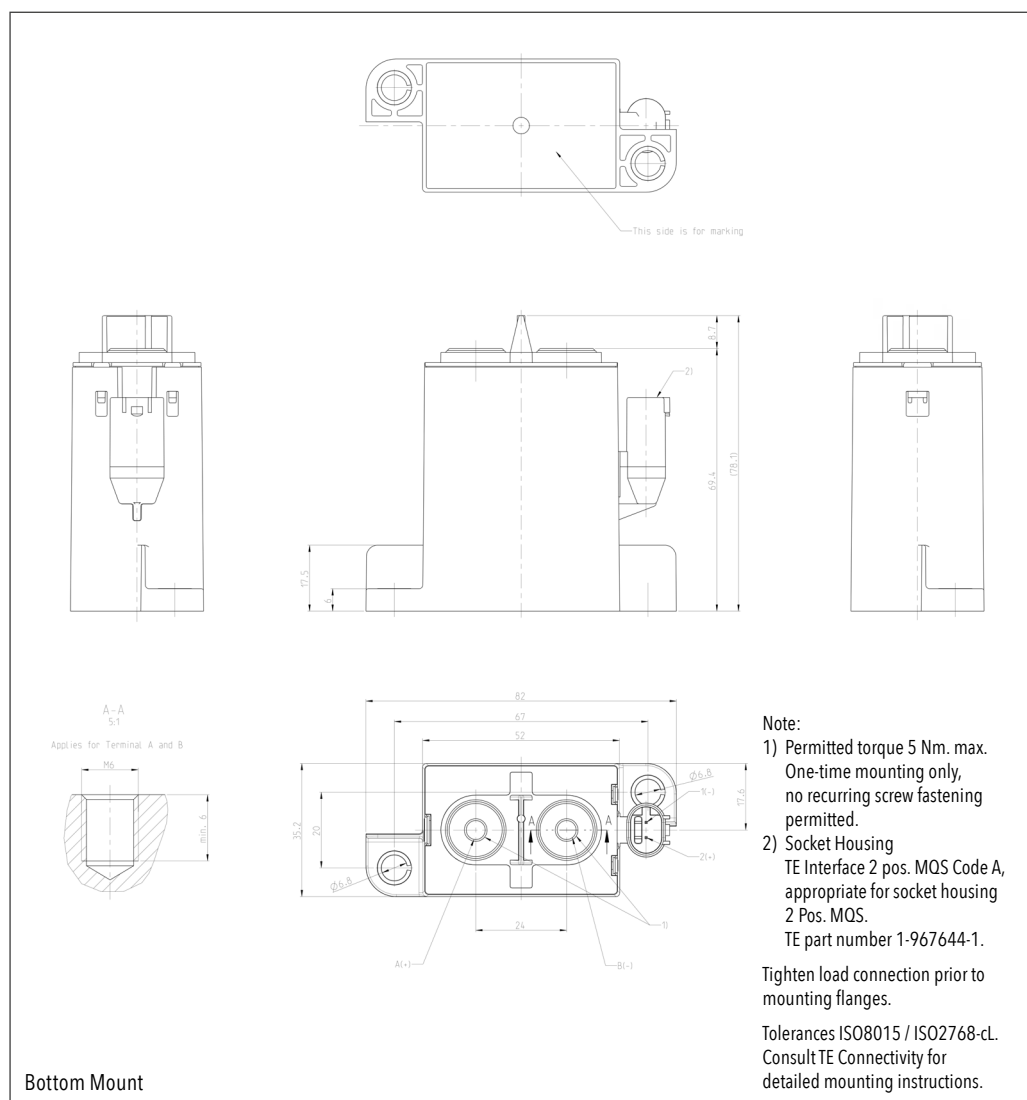
#### Dimensions LxWxH (approx.):

78.1 x 52.0 x 35.2 mm  
(3.1 x 2.0 x 1.4")

#### Weight (approx.):

295 g (10.4 oz)

## EVC 175 Main Contactor- Bottom Mount Version



### Ordering Information EVC 175 Main Contactor - Bottom Mount Version

| Product Code      | Arrangement      | Coil (VDC) | Econo- mization     | Coil Suppr.    | Rated Voltage (VDC) | Terminal Type     | Mounting | Resistance             | Part Number |
|-------------------|------------------|------------|---------------------|----------------|---------------------|-------------------|----------|------------------------|-------------|
| V23717-B0002-A200 | 1 form X (NO DM) | 12         | Internal economizer | Internal       | 450                 | Connector/ Screws | Bottom   | 3.0 / 33.0 Ω Dual coil | 8-1904133-1 |
| V23717-B0001-A200 | 1 form X (NO DM) | 12         | External economizer | External >36 V | 450                 | Connector/ Screws | Bottom   | 5.0 Ω Single coil      | 5-1904144-3 |

<sup>1)</sup> Higher currents possible depending on busbar size and cooling concept.

<sup>2)</sup> Consult TE Connectivity for higher voltages. For details please refer to datasheet.

<sup>3)</sup> Protection class applicable for all mounting orientations except load terminals on top.

- Continuous current 340 A at 85°C (100 mm²) <sup>1)</sup>
- Suitable for voltage levels up to 450 VDC <sup>2)</sup>
- Short circuit carry capability 6,000 A
- Mounting in any direction
- Versions with and without internal economizer

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

**Weight (approx.):**  
520 to 605 g (18.3 to 21.2 oz)  
depending on version

The technical drawing illustrates the dimensions of a TE Connectivity socket housing from three perspectives:

- Top View:** Shows the overall width of 96.4 ± 0.4 mm and height of 85.5 ± 0.4 mm. It details the mounting flange with two M6 screws, specifying a maximum reach of 6mm for the screws. Key dimensions include 77 ± 0.4 mm for the central body width, 16.8 ± 0.4 mm for the flange thickness, and 41.3 ± 0.4 mm for the distance between screw centers.
- Front View:** Displays the profile of the housing with a total height of 85.5 ± 0.4 mm. It indicates a top flange thickness of 2 ± 0.4 mm and a bottom flange thickness of 6.3 ± 0.4 mm. The mounting flange diameter is noted as Ø 6.8 ± 0.2 mm.
- Rear View:** Shows the internal components, including the socket interface (labeled 2) and the socket housing (labeled 3). Dimensions include a total depth of 49.8 ± 0.4 mm, a central cavity width of 45.1 ± 0.4 mm, and a depth of 19.5 ± 0.4 mm for the internal feature.

**Note:**

- Permitted torque 6 Nm. max.  
One-time mounting only,  
no recurring screw fastening  
permitted.
- Socket Housing  
TE Interface 2 pos. MQS Code A,  
appropriate for socket housing  
2 Pos. MQS.  
TE part number 1-967644-1.

Tighten load connection prior to  
mounting flanges.

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

| Product Code      | Arrangement      | Coil (VDC) | Econo- mization | Coil Suppr.     | Rated Voltage (VDC) | Terminal Type     | Mount- ing | Resistance             | Part Number |
|-------------------|------------------|------------|-----------------|-----------------|---------------------|-------------------|------------|------------------------|-------------|
| V23720-A0001-A001 | 1 form X (NO DM) | 12         | No economizer   | External > 36 V | 450                 | Connector/ Screws | Side       | 3.9 Ω Single coil      | 2-1904070-2 |
| V23720-A0002-A001 | 1 form X (NO DM) | 12         | Coil switch     | Internal        | 450                 | Connector/ Screws | Side       | 3.6 / 36.0 Ω Dual coil | 4-1904065-7 |

<sup>3)</sup> Protection class applicable for all mounting orientations except load terminals on top.



### Key Features

- Continuous current 340 A at 85°C (100 mm<sup>2</sup>)<sup>1)</sup>
- Suitable for voltage levels up to 900 VDC
- High peak current carrying capability up to 6000 A<sup>2)</sup>
- Versions with and without internal economizer

### 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 make or break current:

make: 250 A at 50 V (>50,000 ops.)  
break: 50 A at 800 V (>50,000 ops.)

#### Short term current rating:

(1 min) 600 A

#### Short circuit carry current:

(20 ms) 6,000 A

#### Operate / release time typ.:

25 ms at 14 VDC (coil voltage)

### Coil Data

#### Rated coil voltage:

12 VDC, 24 VDC

#### Coil resistance (+23°C):

3.9 Ω (single coil),  
2.6 / 26 Ω (12 V dual coil),  
5.0 / 79 Ω (24 V dual coil)

### Other Data

#### Temperature range:

-40°C to +85°C

#### Category and degree of protection:

dustproof, IP 50 (upright);  
IP54<sup>3)</sup> (others)

#### Terminal type and mounting:

Connector (coil) / M6 bolts (load);  
screws

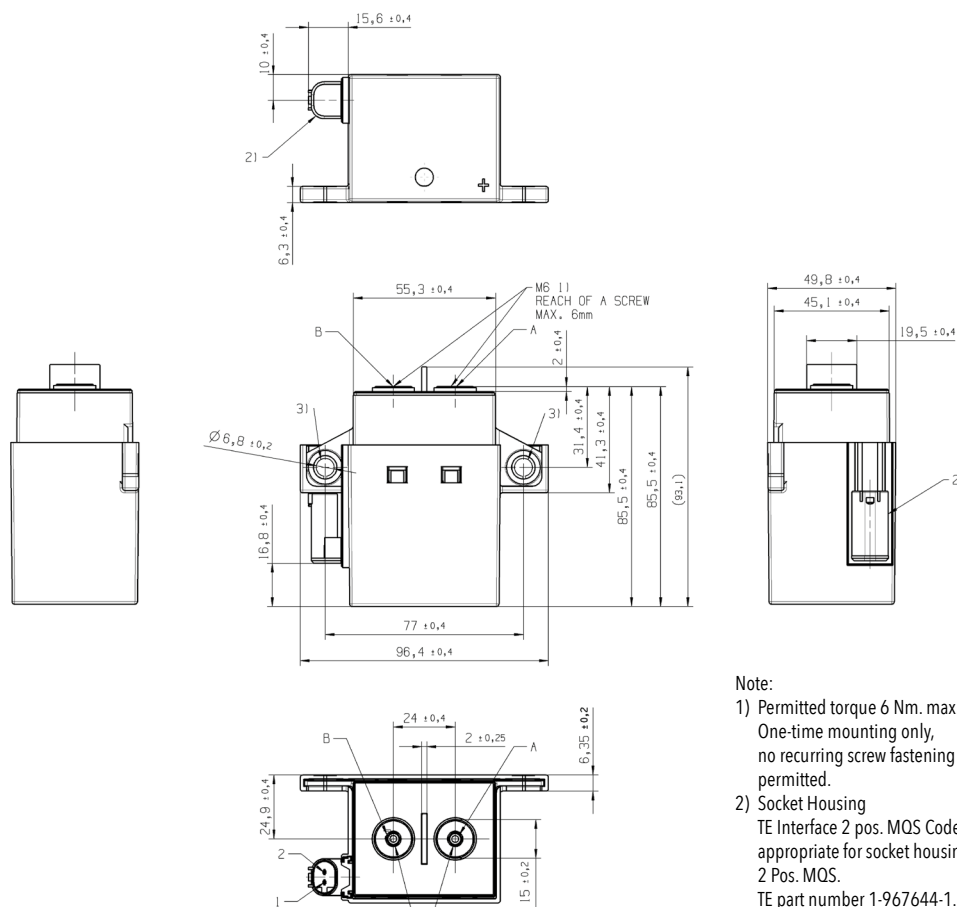
#### Dimensions LxWxH (approx.):

93.1 x 55.3 x 49.8 mm  
(3.7 x 2.2 x 2.0")

#### Weight (approx.):

525 to 580 g (18.5 to 20.5 oz)  
depending on version

## EVC 250-800 Main Contactor



Side Mount

### Ordering Information EVC 250-800 Main Contactor

| Product Code      | Arrangement      | Coil (VDC) | Econo- mization       | Coil Suppr. | Rated Voltage (VDC) | Terminal Type     | Mounting | Resistance           | Part Number |
|-------------------|------------------|------------|-----------------------|-------------|---------------------|-------------------|----------|----------------------|-------------|
| V23720-A0101-B001 | 1 form X (NO DM) | 12         | External economizer   | tbd         | 800                 | Connector/ Screws | Side     | 3.9 Ω Single coil    | 2-1904136-5 |
| V23720-A0102-B001 | 1 form X (NO DM) | 12         | Dual coil int. switch | tbd         | 800                 | Connector/ Screws | Side     | 2.6 / 26 Ω Dual coil | 7-1904137-6 |
| V23720-A0112-B00  | 1 form X (NO DM) | 24         | Dual coil int. switch | tbd         | 800                 | Connector/ Screws | Side     | 5.0 / 79 Ω Dual coil | 2-2317670-1 |

<sup>1)</sup> Higher currents possible depending on busbar size and cooling concept.

<sup>2)</sup> Consult TE Connectivity for higher voltages. For details please refer to datasheet.

<sup>3)</sup> Protection class applicable for all mounting orientations except load terminals on top.



### Key Features

- Continuous current 500 A at 85°C (214 mm²)
- Load voltage up to 450 VDC <sup>1)</sup>
- 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 <sup>1)</sup>

**Limiting cont. current at 85°C:**

500 A

**Limiting make or break 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 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

### Coil Data

**Temperature range:**

-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.):**

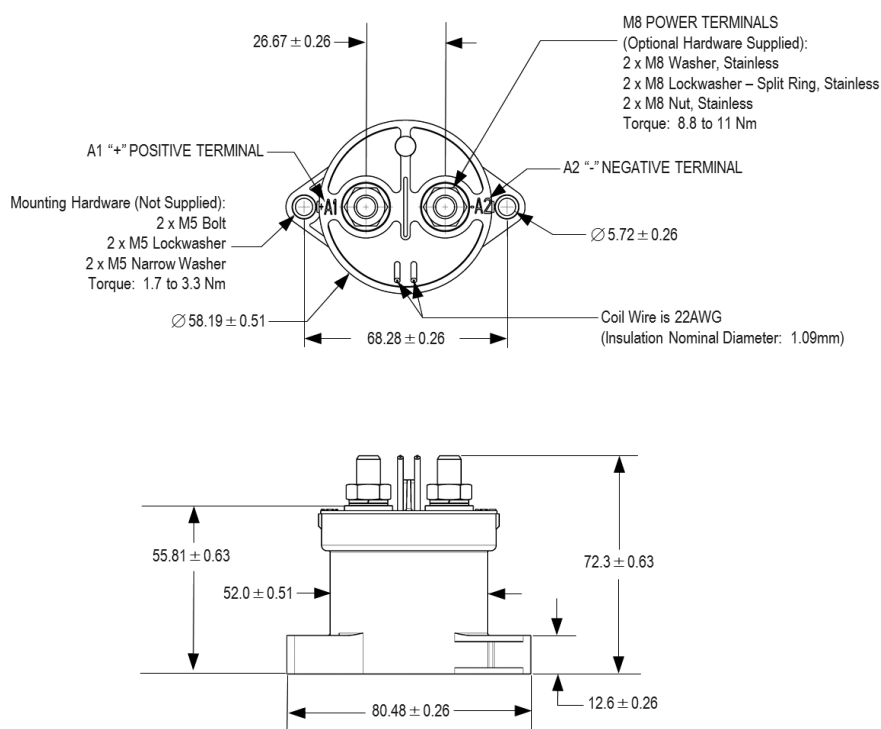
80.5 x 58.2 x 72.3 mm

(3.2 x 2.3 x 2.9")

**Weight (approx.):**

430 g (15.2 oz)

## EVC 500 Main Contactor



Bottom Mount (without coil economizer)

### Ordering Information EVC 500 Main Contactor

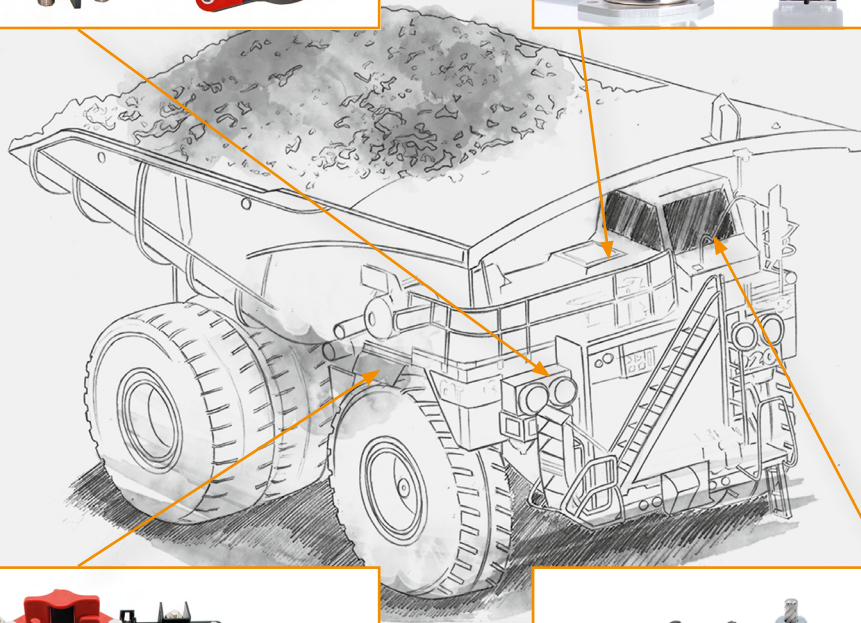
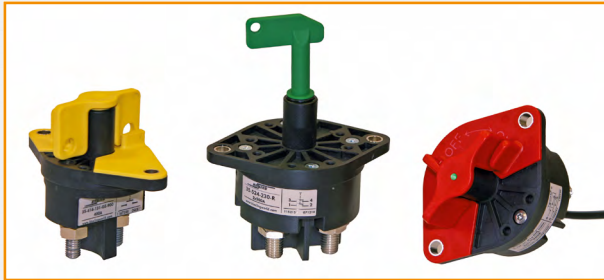
| Product Code   | Arrangement      | Coil (VDC) | Economization | Coil Suppr.     | Rated Voltage (VDC) | Terminal Type           | Mounting | Resistance | Part Number Asia Production Americas Prod. |
|----------------|------------------|------------|---------------|-----------------|---------------------|-------------------------|----------|------------|--------------------------------------------|
| EVC 500-A1ANAM | 1 form X (NO DM) | 12         | No economizer | External > 40 V | 450                 | Stripped wires / Screws | Bottom   | 3.14 Ω     | 2219561-1<br>2098372-1                     |
| EVC 500-AAANAM | 1 form X (NO DM) | 12         | Internal PWM  | Internal        | 450                 | Stripped wires / Screws | Bottom   | 3.14 Ω     | 2299223-2<br>2098190-1                     |

<sup>1)</sup> Consult TE Connectivity for higher voltages. For details please refer to datasheet.

<sup>2)</sup> Protection class applicable for all mounting orientations except load terminals on top.



# RUGGEDIZED, QUALITY SWITCHING PRODUCTS



## Key capabilities aligned with fast-growing electrification and safety trends within High-Voltage Power Distribution by KISSLING, a TE Connectivity Company

E-Mobility is playing an increasingly important role in the design of new generation commercial vehicles, including trucks, buses, construction and working vehicles. The move to electric drive system brings a number of environmental advantages but also poses some major challenges with handling high on-board power and charging currents and meeting stringent safety requirements under possibly harsh operating environments.

KISSLING, a TE Connectivity Company, is an industry leading provider of high power and high voltage relays and ruggedized switches used in commercial vehicle, transportation, industrial and other applications.

**Product page or contact us:** [info.kissling@te.com](mailto:info.kissling@te.com)

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## APPLICATION TOOLING

# HIGH VOLTAGE CABLE PROCESSING SOLUTIONS

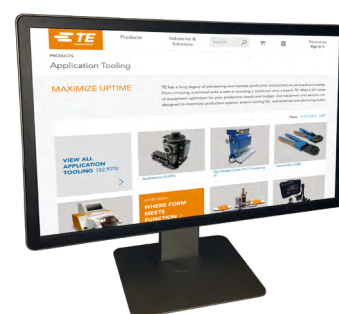
A FLEXIBLE APPROACH TO LARGE WIRE CABLE PROCESSING



### Let's Connect

To find the right TE tooling for your needs, call us at **+1.717.810.2082** or email **toolingSales@te.com**.

For more product information please visit [te.com/hvtooling](https://te.com/hvtooling)



### TE Technical Support Center

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 Latin/S. America +54.11.4733.2200  
 Germany: +49.6151.607.1999

UK: +44.0800.267666  
 France: +33.1.34.20.8686  
 Netherlands: +31.73.624.6999  
 China: +86.400.820.6015

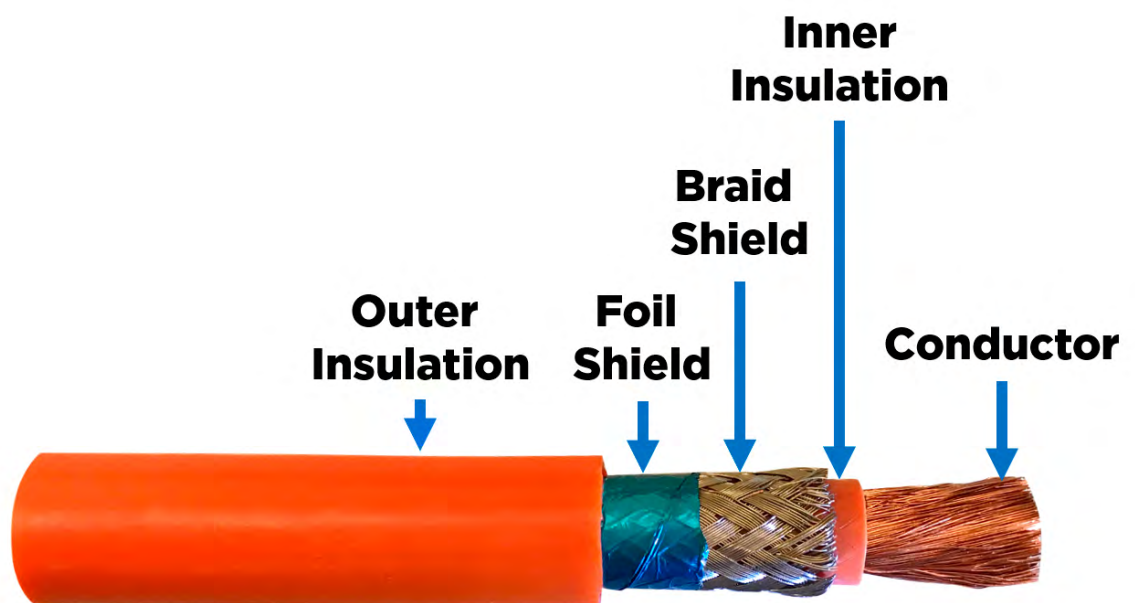
# FLEXIBLE HIGH FORCE PROCESSING SOLUTIONS



TE Connectivity (TE) offers a wide range of wire processing solutions to handle challenging small wire applications up through complex  $120 \text{ mm}^2$  high voltage cables. Our high force lineup gives you the power needed to process large wire applications in a fast, flexible, and affordable format.

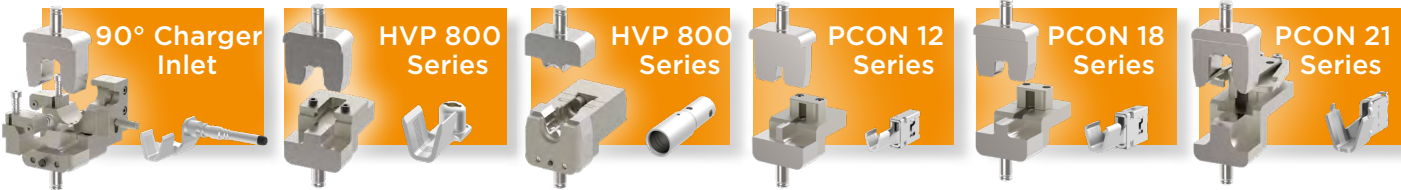
## Challenges of High Voltage Cables

High voltage cables require clean, precise cuts to maintain quality and safety standards. The TE suite of high force cable prep and termination equipment has been designed around those very high standards.



# HIGH FORCE TERMINATING SOLUTIONS

## HV Modular Die Sets



This is only a cross section of die sets and terminals available. Our modular die holders can accommodate both TE and non-TE terminals. For a more complete list please visit [tooling.te.com](http://tooling.te.com) or contact your TE Application Tooling sales representative.

## HV Modular Die Holders — Loaded with Features

With Fine Adjust for HV-20 Machines

For AT-66 Machines

Fine adjust feature allows for faster, more precise crimp height adjustment.

The multi-platform design of our modular HV die holders allows for use in a variety of TE and non-TE terminators.

The wire clamp assembly, handle and die sets can easily be adjusted to handle left or right side wire processing.

Spring-loaded wire clamp assembly accommodates a variety of different wire sizes to match your processing needs.

### Modular Die Holder Part Numbers

|             | Description                                                                                                       | Part Number |
|-------------|-------------------------------------------------------------------------------------------------------------------|-------------|
| Die Holders | HV MOD Die Holder w/Fine Adjust                                                                                   | 2305470-1   |
|             | HV MOD Die Holder w/o Fine Adjust<br>For AT-66 Terminator only<br>(Can not be used in HV-20 or HF-20 Terminators) | 2326378-1   |

# HIGH VOLTAGE WIRE PROCESSING



Part Number 2335400-1

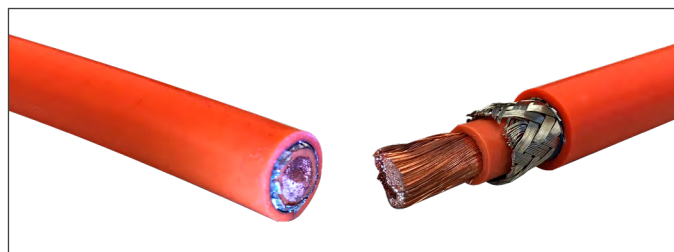
Take the complexity and long preparation times out of your high voltage cable processing with the new HV-CP machine from TE. This machine can process (10-120 mm<sup>2</sup>) multi-layered conductors in as fast as 30 seconds!

## Multi-Step Stripping

The HV-CP machine will strip the outer jacket, foil shield, braid shield, and inner insulation to meet your termination specifications.

To confirm proper preparation of the cable, several unique quality control measures are in place.

- The machine has the ability to confirm installation of the proper tooling before running
- The HV-CP can self-calibrate the blade positions after tooling changeover
- The machine confirms cable position before and after the prep process to confirm proper strip lengths



## Process complex multi-layered HV cables in as fast as 30 seconds!

For ease-of-use the HV-CP machine has an intuitive touch screen interface with a memory that accommodates up to 1,500 different profiles.

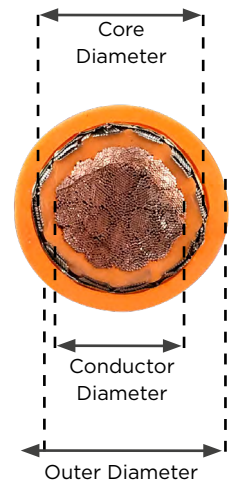
## Specifications

| Description                        | Specification                                            | Description                             | Specification       |
|------------------------------------|----------------------------------------------------------|-----------------------------------------|---------------------|
| Wire Cross Section                 | 10 mm <sup>2</sup> – 120 mm <sup>2</sup>                 | Increments for Incision Diameter        | 0.01 mm (0.0004 in) |
| Max. Outer Diameter                | 25.0 mm (1 in)                                           | Increment for Stripping Length          | 0.01 mm (0.0004 in) |
| Min Diameter of Inner Conductors   | 6.0 mm (0.24 in)                                         | Maximum Outer Jacket Strip Length       | 80 mm (3.15 in)     |
| Max Wire Cross Section for Cutting | 2 mm <sup>2</sup> / AWG 14 / 1.6 mm diam (0.063 in diam) | Profile Library: Max Number of Articles | 1500                |
| Typical Cycle Time                 | 30 sec                                                   | Sequence Function: Max Number of Steps  | 100                 |



## High Voltage Cable Prep Spare Tooling Part Numbers

| Machine Part# | Cable Size (mm <sup>2</sup> ) | Outer Diameter | Core Diameter | Conductor Diameter (mm Max) | Contour Blade Assembly Kit Part # | Mandrel Assembly Kit Part # | Cutting Wheels Part # |
|---------------|-------------------------------|----------------|---------------|-----------------------------|-----------------------------------|-----------------------------|-----------------------|
| 2335400-1     | 10                            | 8.8 (-0.6)     | 6.0 (-0.6)    | 4.5                         | 2364113-1                         | 2360456-1                   | 2844837-1             |
|               | 16                            | 10.2 (-0.6)    | 7.2 (-0.6)    | 5.8                         | 2364113-2                         | 2360456-2                   |                       |
|               | 25                            | 12.2 (-0.6)    | 8.7 (-0.6)    | 7.2                         | 2364113-3                         | 2360456-3                   |                       |
|               | 35                            | 14.4 (-0.6)    | 10.4 (-0.7)   | 8.5                         | 2364113-4                         | 2360456-4                   |                       |
|               | 50                            | 15.8 (-0.6)    | 12.2 (-0.7)   | 10.5                        | 2364113-5                         | 2360456-5                   |                       |
|               | 60                            | 16.9 (-0.6)    | 13.3 (-1.2)   | 11.6                        | 2364113-6                         | 2360456-6                   |                       |
|               | 70                            | 18.2 (-0.6)    | 14.4 (-1.2)   | 12.5                        | 2364113-7                         | 2360456-7                   |                       |
|               | 95                            | 20.9 (-0.6)    | 17.2 (-1.2)   | 14.8                        | 2364113-8                         | 2360456-8                   |                       |
|               | 120                           | 23 (-0.8)      | 19 (-1.2)     | 16.5                        | 2364113-9                         | 2360456-9                   |                       |



## HV-CP FEATURES



Combining sophisticated controls, traceability system and equipped with ethernet and USB ports, the HV-CP high voltage cable prep machine is Industry 4.0 ready.

Integrated air jets for automatic blade cleaning and an in-line vacuum to remove slugs keep the processing area clean and efficient. A removable container is located inside the chassis for easy waste disposal.



1470 mm (h)



# HIGH VOLTAGE WIRE TERMINATION



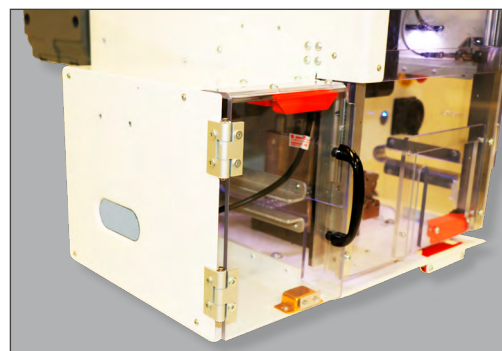
The HF-20 and HV-20 are robust, compact, high force bench top machines capable of terminating cables up to 120 mm<sup>2</sup>.

Both models are eccentric presses capable of reaching 178kN (20T) of crimp force, with fast, repeatable accuracy. The HV-20 model comes with a CQM II digital interface for crimp force monitoring, variable speed and an integrated vacuum system to keep sensitive connections clean and clear of debris commonly associated with high voltage cable processing.

## Flexible Design

To best fit the application process, the flexible design of the high force machines accommodates multiple processing orientations.

The adjustable die holder platform can be easily rotated to handle processing from the left, front or right side of the unit. Side feed guarding is also available for all models to accommodate both loose piece and reeled terminal applications.



## Safe, Easy Operation

Both models offer a simple push button design with multiple interlock features to confirm operator safety throughout the crimping process.

## High Force Terminator Part Numbers

|            | Description                          | Press Part Number      |                                                |
|------------|--------------------------------------|------------------------|------------------------------------------------|
|            |                                      | w/Loose Piece Guarding | w/Side Feed Guarding<br>(for reeled terminals) |
| Terminator | HF-20, High Force Terminator, 400V   | 2335500-1              | 2358697-1                                      |
|            | HF-20, High Force Terminator, 200V   | 2335500-2              | 2358697-2                                      |
|            | HV-20, High Voltage Terminator, 400V | 2348822-1              | 2358698-1                                      |
|            | HV-20, High Voltage Terminator, 200V | 2348822-2              | 2358698-2                                      |

# SIDE-BY-SIDE COMPARISON



|                                      | HF-20T                          | HV-20T                          | Competitor 1<br>Large Press Offering | Competitor 2<br>Large Press Offering |
|--------------------------------------|---------------------------------|---------------------------------|--------------------------------------|--------------------------------------|
| Force                                | 178kN (20T)                     | 178kN (20T)                     | 150kN (17T)                          | 178kN (20T)                          |
| Max Wire                             | 120 mm <sup>2</sup>             | 120 mm <sup>2</sup>             | 100 mm <sup>2</sup>                  | 120 mm <sup>2</sup>                  |
| Variable Stroke (Sec)<br>Speed (RPM) | 1.3 - 8.3 Sec<br>288 - 1800 RPM | 1.3 - 8.3 Sec<br>288 - 1800 RPM | 1.2 Sec (fixed)<br>1420 RPM          | (fixed)<br>1200 RPM                  |
| Power                                | 3kW                             | 3kW                             | 4kW                                  | 7.5 kW                               |
| Supply                               | 200V & 400V                     | 200V & 400V                     | 400V                                 | 200V & 400V                          |
| Stroke / Shut Height                 | 44 mm / 158.4 mm                | 44 mm / 158.4 mm                | 50 mm / 204.8 mm                     | 50 mm / 190 mm                       |
| Weight                               | 390 kg                          | 390 kg                          | 500 kg                               | 1550 kg                              |
| Network/MES                          | RJ-45 / MQTT                    | RJ-45 / MQTT                    | -                                    | -                                    |
| Particle Vacuum                      | -                               | Yes                             | No                                   | No                                   |
| Guard Auto Lift                      | Yes                             | Yes                             | Yes                                  | Optional                             |
| CQM/CFM                              | -                               | Yes                             | Optional                             | Optional                             |

## HV-20T & HF-20T FEATURES

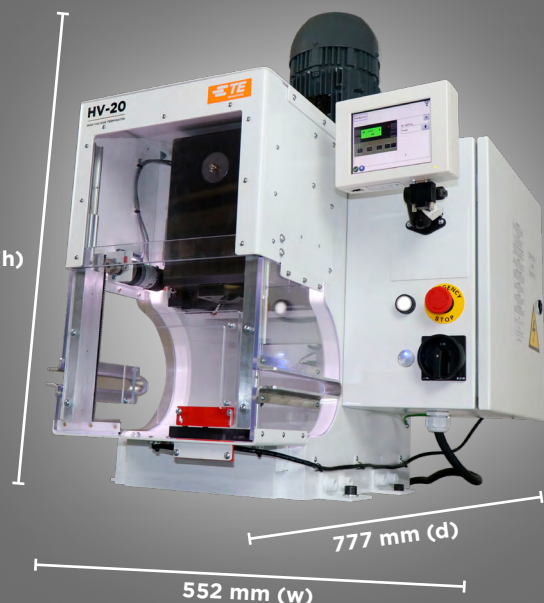


Combining sophisticated controls, traceability system and equipped with ethernet and USB ports, the HV-20T and HF-20T bench-top terminators are Industry 4.0 ready.

The integrated vacuum system design keeps sensitive connections clean and clear of debris commonly associated with high voltage cable crimping.



974 mm (h)





## Standards

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### Specifications

TE Connectivity connectors are still made on IEC 664/664 A, DIN VDE 0110/01.89 and DIN VDE 0627/06.86 standards. The standards have defined normal rules and requirements which include features construction and requirements.

To determine the minimum clearances and creepage distance, the recent applicable standard is the IEC 60664-1 standard (10.92), a fundamental safety standard to which all product in the committees should refer.

If no notice to products in the catalog, clearance and creepage distances of all products in the catalog are based on DIN VDE 0110:1989-01 and degrees pollution 3.

#### Include some contents:

1. Over-voltage categories (I, II, III, IV)
2. Degrees of pollution
3. Insulating material
4. Determination of clearances

### Over-Voltage Categories

#### 1. Over-voltage category I

Equipment in over-voltage category I is only intended for use in apparatus or parts of systems in which no over-voltages will occur or are specially protected against over-voltages by means of surge voltages, filters or capacitors.

#### 2. Over-voltage category II

Equipment in over-voltage category II is intended for use in systems or parts there of in which lightning over-voltages do not have to be taken into account.

#### 3. Over-voltage category III

Equipment in over-voltage category III is intended for use in equipment for fixed installation, i.e. protective devices, relays, switches and plug devices.

## Insulation Coordination for Electrical Connectors in Low Voltage Plants

**Dimensioning of clearance and creeping distances acc. to DIN EN60664-1; following pages show only a part of the standards.**

### Insulation Coordination

Insulation coordination includes the design of the electrical insulation of a connector depending on its use and environment. This occurs either by design of the clearance distances (basis is the expected power surge) or by design of the creeping distance (basis is the operating voltage as well as the quality of the insulating material). Furthermore, insulation-changing conditions are taken into account (pollution, protective measures against pollution, air pressure, thermal or chemical influences).

Air distances are measured according to the outer or inner power surge expected. The four power surge classes (power surge categories I to IV) take the different use of the connector into account. Depending on the homogeneity of the field between the electrodes (case A – inhomogenous field, case B – homogenous field) the air distances can be determined according to table 2a (minimum air distances); industrial connectors are always determined according to case A.

The influence from pollution when determining the air- and creeping distances is taken into account by using four degrees of severity (pollution degree 1 to 4).

Basis of the creeping distances is the rated voltage which is deduced from the operating voltage. The minimum creeping distances are allocated in table 4 depending on the severity of pollution. If the product descriptions do not contain any additional information the products listed in this catalog were rated according to norm DIN VDE 0110 for surge category III and severity of pollution 3.

### Surge Category I to IV

- Resources of surge category I are goods for the termination of fixed electrical installations of a building. Measures for the limitation of transient surges were taken either in the fixed installation or between the fixed installation and the equipment.
- Resources of surge category II are resources which use power and are fed from a fixed installation. Note: e.g. domestic appliances, portable tools and other appliances as well as similar consumers.
- Resources of surge category III are part of a fixed installation. They are resources from which a high degree of availability is expected.
- Note: Examples for such appliances are e.g. industrial connectors, distribution panels, power switches, distributors, switches, sockets.
- Devices of surge category IV are for use at the supply terminal of the installation. Note: Examples for such appliances are electricity counters, overload cut-out switches.

### Pollution Degree 1 to 4

DIN VDE 0110 defines the pollution degrees as follows:

#### Pollution Degree 1:

There is no or only dry, non-conductive pollution. The pollution is without influence.

#### Pollution Degree 2:

There is only non-conductive pollution. Occasional momentary conductivity due to condensation.

#### Pollution Degree 3:

There is conductive pollution or dry non-conductive pollution, which becomes conductive due to condensation.

#### Pollution Degree 4:

There is a continuous conductivity due to conductive dust, rain or moisture.

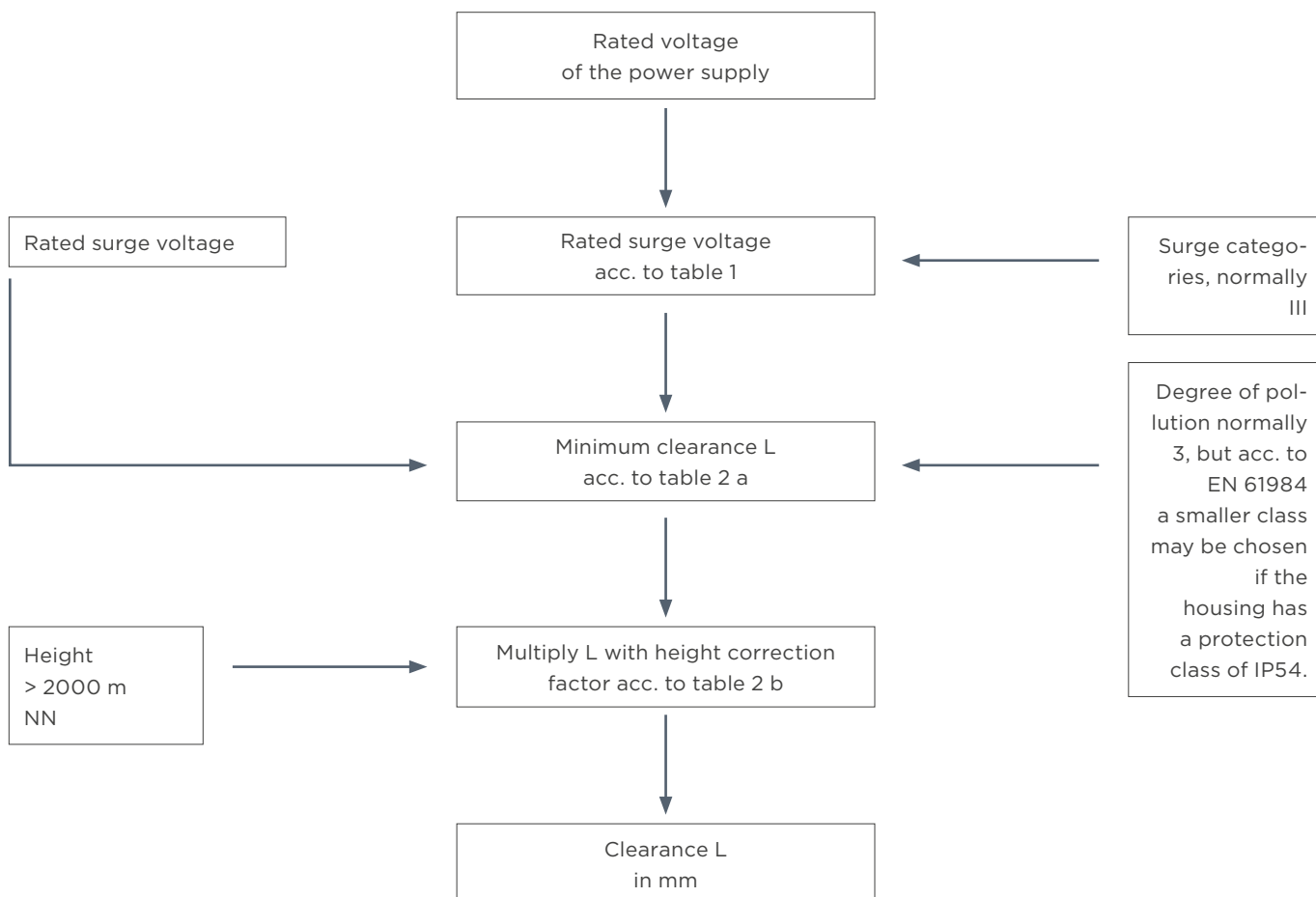
### Insulation Material

The insulation materials are divided into the following four groups depending on their comparative tracking index (CTI):

|                            |                             |
|----------------------------|-----------------------------|
| Insulation material I:     | $600 \leq \text{CTI}$       |
| Insulation material II:    | $400 \leq \text{CTI} < 600$ |
| Insulation material III a: | $175 \leq \text{CTI} < 400$ |

## Measurement of Clearances

### Diagram for the Determination of Clearances



### Rated Surge Voltage for Utilities

| Rated Voltage of the Power Supply* in V |                              | Rated Surge Voltage in kV (1.2/50ms) for                      |                                                                |                                                                     |                                                  |
|-----------------------------------------|------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------|
| 3-phase systems                         | Single systems in the centre | Utilities at the feed of the installation (surge category IV) | Utilities as part of a fixed installation (surge category III) | Utilities for connection to fixed installations (surge category II) | Specially protected utilities (surge category I) |
|                                         | 120 up to 240                | 4                                                             | 2.5                                                            | 1.5                                                                 | 0.8                                              |
| 230/400**<br>277/480**                  |                              | 6                                                             | 4                                                              | 2.5                                                                 | 1.5                                              |
| 400/690**                               |                              | 8                                                             | 6                                                              | 4                                                                   | 2.5                                              |
| 1000                                    |                              | 12                                                            | 8                                                              | 6                                                                   | 4                                                |

\*) Chosen voltage values

\*\*) The / dash is for a 3-phase system with 4 lines. The lower value is for phase to neutral, the higher value is for phase to phase.

### Minimum Clearance in Air at Installation Heights of up to 2000 m above Sea Level (NN)

| Rated surge voltage [kV] | Case A, inhomogenous field, degree of pollution |        |        |        | Case B, homogenous field, degree of pollution |        |        |        |
|--------------------------|-------------------------------------------------|--------|--------|--------|-----------------------------------------------|--------|--------|--------|
|                          | 1 (mm)                                          | 2 (mm) | 3 (mm) | 4 (mm) | 1 (mm)                                        | 2 (mm) | 3 (mm) | 4 (mm) |
| 0.33 _)                  | 0.01                                            | _)     | 0.80   | 1.6    | 0.01                                          | _)     | 0.8    | 1.6    |
| 0.40                     | 0.02                                            |        |        |        | 0.02                                          |        |        |        |
| 0.5 _)                   | 0.04                                            |        |        |        | 0.04                                          |        |        |        |
| 0.60                     | 0.06                                            |        |        |        | 0.06                                          |        |        |        |
| 0.80 _)                  | 0.10                                            |        |        |        | 0.10                                          |        |        |        |
| 1.0                      | 0.15                                            | 0.25   | 1.0    | 1.6    | 0.15                                          | 0.2    | 0.8    | 1.6    |
| 1.2                      | 0.25                                            |        |        |        | 0.2                                           |        |        |        |
| 1.5 _)                   | 0.5                                             | 0.5    | 1.0    | 1.6    | 0.3                                           | 0.3    | 0.8    | 1.6    |
| 2.0                      | 1.0                                             | 1.0    |        |        | 0.45                                          | 0.5    |        |        |
| 2.5 _)                   | 1.5                                             | 1.5    | 1.5    | 1.6    | 0.6                                           | 0.6    | 0.8    | 1.6    |
| 3.0                      | 2                                               | 2      | 2      |        | 0.8                                           | 0.8    |        |        |
| 4.0 _)                   | 3                                               | 3      | 3      | 3      | 1.2                                           | 1.2    | 1.2    | 1.6    |
| 5.0                      | 4                                               | 4      | 4      | 4      | 1.5                                           | 1.5    | 1.5    |        |
| 6.0 _)                   | 5.5                                             | 5.5    | 5.5    | 5.5    | 2                                             | 2      | 2      | 2      |
| 8.0 _)                   | 8                                               | 8      | 8      | 8      | 3                                             | 3      | 3      | 3      |
| 10                       | 11                                              | 11     | 11     | 11     | 3.5                                           | 3.5    | 3.5    | 3.5    |
| 12 _)                    | 14                                              | 14     | 14     | 14     | 4.5                                           | 4.5    | 4.5    | 4.5    |
| 15                       | 18                                              | 18     | 18     | 18     | 5.5                                           | 5.5    | 5.5    | 5.5    |
| 20                       | 25                                              | 25     | 25     | 25     | 8                                             | 8      | 8      | 8      |
| 25                       | 33                                              | 33     | 33     | 33     | 10                                            | 10     | 10     | 10     |
| 30                       | 40                                              | 40     | 40     | 40     | 12.5                                          | 12.5   | 12.5   | 12.5   |
| 40                       | 60                                              | 60     | 60     | 60     | 17                                            | 17     | 17     | 17     |
| 50                       | 75                                              | 75     | 75     | 75     | 22                                            | 22     | 22     | 22     |
| 60                       | 90                                              | 90     | 90     | 90     | 27                                            | 27     | 27     | 27     |
| 80                       | 130                                             | 130    | 130    | 130    | 35                                            | 35     | 35     | 35     |
| 100                      | 170                                             | 170    | 170    | 170    | 45                                            | 45     | 45     | 45     |

1) The voltage is for

- Functional insulation: the maximum impulse voltage expected to occur across the clearance
- Basic insulation directly exposed by transient overvoltages
- Other basic insulation

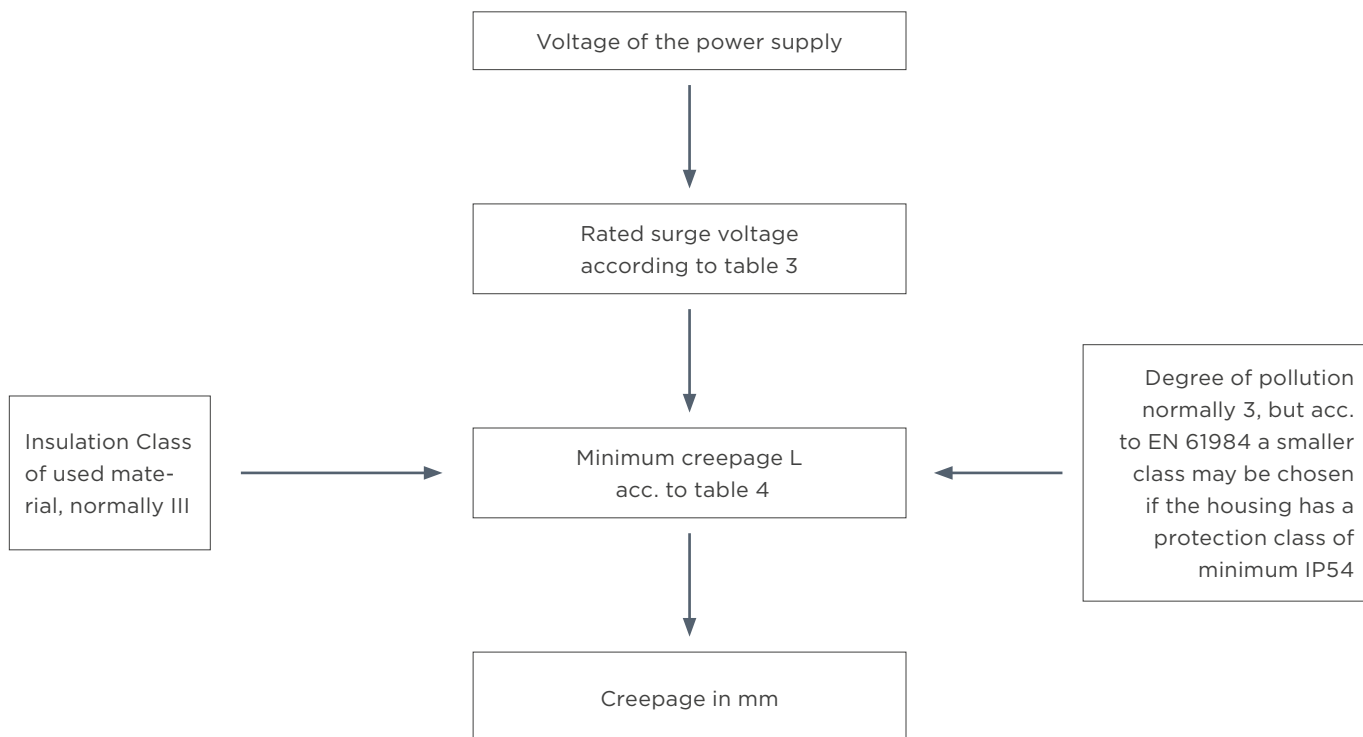
\_ ) Preferred values

### Factors for Height Correction

| Height in m | Normal Air Pressure in kPa | Multiplication Factor for Distances |
|-------------|----------------------------|-------------------------------------|
| 2000        | 80.0                       | 1.00                                |
| 3000        | 70.0                       | 1.14                                |
| 4000        | 62.0                       | 1.29                                |
| 5000        | 54.0                       | 1.48                                |
| 6000        | 47.0                       | 1.70                                |
| 7000        | 41.0                       | 1.95                                |
| 8000        | 35.5                       | 2.25                                |
| 9000        | 30.5                       | 2.62                                |
| 10000       | 26.5                       | 3.02                                |
| 15000       | 12.0                       | 6.67                                |
| 20000       | 5.5                        | 14.50                               |

## Measurement of Creepage

### Diagram for the Determination of Creepage



| Voltage of the Power Supply [V] | Rated Voltage [V] |
|---------------------------------|-------------------|
| 60                              | 63                |
| 110/120/127                     | 125               |
| 150                             | 160               |
| 208                             | 200               |
| 220/230/240                     | 250               |
| 300                             | 320               |
| 380/400/415                     | 400               |
| 440                             | 500               |
| 480/500                         | 500               |
| 575                             | 630               |
| 600                             | 630               |
| 660/690                         | 630               |
| 720/830                         | 800               |
| 960                             | 1000              |
| 1000                            | 1000              |

Table 3

\*The above shown table does not give the entire correlation of world-wide used networks and rated voltages; it is reduced to the most common ones; further details, see DIN EN60664-1.

### Creepages in [mm] for Electrical Equipments

| Rated Voltage [V] | Degree of Pollution     |                    |      |      |                    |      |      |                    |      |      |
|-------------------|-------------------------|--------------------|------|------|--------------------|------|------|--------------------|------|------|
|                   | 1 All Insulator Classes | 2 Insulation Class |      |      | 3 Insulation Class |      |      | 4 Insulation Class |      |      |
|                   |                         | I                  | II   | III  | I                  | II   | III  | I                  | II   | III  |
| 10                | 0.08                    | 0.40               | 0.40 | 0.40 | 1.00               | 1.00 | 1.00 | 1.6                | 1.6  | 1.6  |
| 12.5              | 0.09                    | 0.42               | 0.42 | 0.42 | 1.05               | 1.05 | 1.05 | 1.6                | 1.6  | 1.6  |
| 16                | 0.10                    | 0.45               | 0.45 | 0.45 | 1.10               | 1.10 | 1.10 | 1.6                | 1.6  | 1.6  |
| 20                | 0.110                   | 0.48               | 0.48 | 0.48 | 1.20               | 1.20 | 1.20 | 1.6                | 1.6  | 1.6  |
| 25                | 0.125                   | 0.50               | 0.50 | 0.50 | 1.25               | 1.25 | 1.25 | 1.7                | 1.7  | 1.7  |
| 32                | 0.140                   | 0.53               | 0.53 | 0.53 | 1.30               | 1.30 | 1.30 | 1.8                | 1.8  | 1.8  |
| 40                | 0.16                    | 0.56               | 0.80 | 1.10 | 1.4                | 1.6  | 1.8  | 1.9                | 2.4  | 3.0  |
| 50                | 0.18                    | 0.60               | 0.85 | 1.20 | 1.5                | 1.7  | 1.9  | 2.0                | 2.5  | 3.2  |
| 63                | 0.20                    | 0.63               | 0.90 | 1.25 | 1.6                | 1.8  | 2.0  | 2.1                | 2.6  | 3.4  |
| 80                | 0.22                    | 0.67               | 0.95 | 1.3  | 1.7                | 1.9  | 2.1  | 2.2                | 2.8  | 3.6  |
| 100               | 0.25                    | 0.71               | 1.00 | 1.4  | 1.8                | 2.0  | 2.2  | 2.4                | 3.0  | 3.8  |
| 125               | 0.28                    | 0.75               | 1.05 | 1.5  | 1.9                | 2.1  | 2.4  | 2.5                | 3.2  | 4.0  |
| 160               | 0.32                    | 0.80               | 1.1  | 1.6  | 2.0                | 2.2  | 2.5  | 3.2                | 4.0  | 5.0  |
| 200               | 0.42                    | 1.00               | 1.4  | 2.0  | 2.5                | 2.8  | 3.2  | 4.0                | 5.0  | 6.3  |
| 250               | 0.56                    | 1.25               | 1.8  | 2.5  | 3.2                | 3.6  | 4.0  | 5.0                | 6.3  | 8.0  |
| 320               | 0.75                    | 1.60               | 2.2  | 3.2  | 4.0                | 4.5  | 5.0  | 6.3                | 8.0  | 10.0 |
| 400               | 1.00                    | 2.00               | 2.8  | 4.0  | 5.0                | 5.6  | 6.3  | 8.0                | 10.0 | 12.5 |
| 500               | 1.30                    | 2.50               | 3.6  | 5.0  | 6.3                | 7.1  | 8.0  | 10.0               | 12.5 | 16.0 |
| 630               | 1.8                     | 3.2                | 4.5  | 6.3  | 8.0                | 9    | 10.0 | 12.5               | 16   | 20   |
| 800               | 2.4                     | 4.0                | 5.6  | 8.0  | 10.0               | 11   | 12.5 | 16.0               | 20   | 25   |
| 1000              | 3.2                     | 5.0                | 7.1  | 10.0 | 12.5               | 14   | 16.0 | 20.0               | 25   | 32   |

Table 4

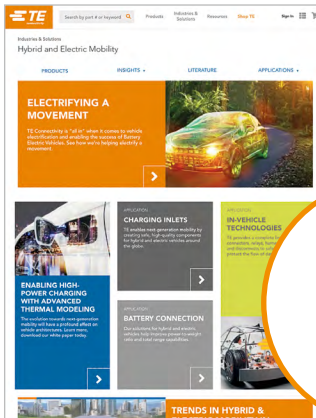






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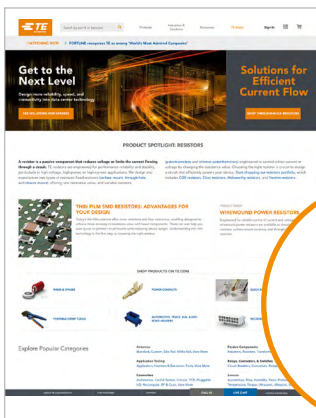
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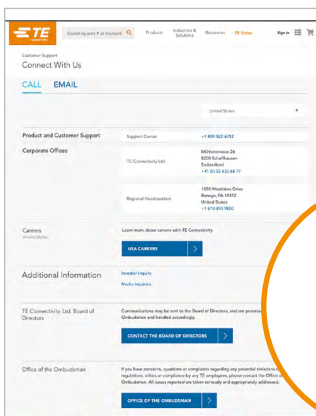
[www.te.com/hybrid-electric-mobility](http://www.te.com/hybrid-electric-mobility)



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