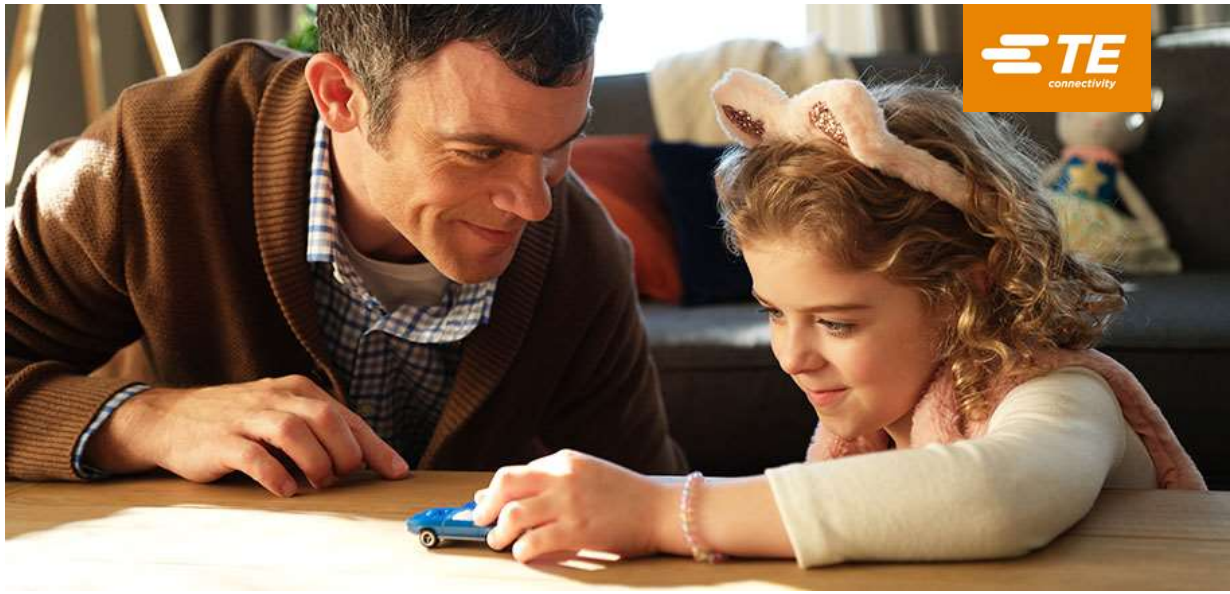
E-mobility Product & Application Training

BRUNO LACOMBE
ICT Field Application Engineer

EVERY CONNECTION COUNTS



Agenda

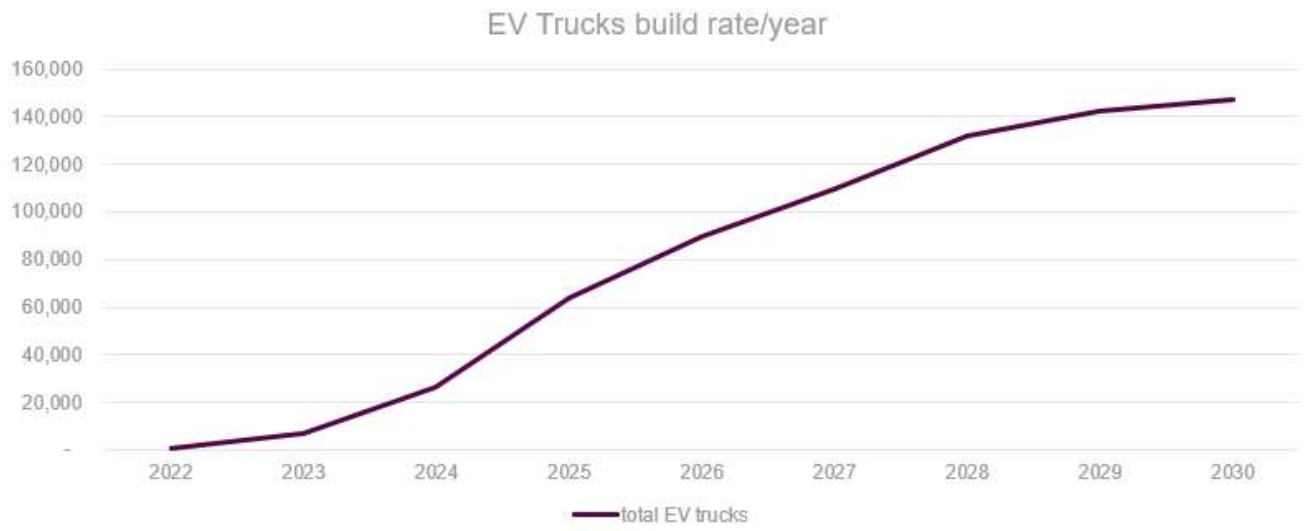
- **Why are we here?**
- **Product Overview**
- **EV Architecture**
- **Applications**
  - E- MOTOR
  - INVERTER
  - BATTERY PACKS
  - CHARGER
  - POWER DISTRIBUTION UNIT / BOX
  - ACCESSORIES
    - FANS
    - PUMPS / COMPRESSORS
    - THERMAL MANAGEMENT
    - DC/DC CONVERTERS

EVERY CONNECTION COUNTS

Why are we here?

Electrification of Industrial & Commercial Vehicles

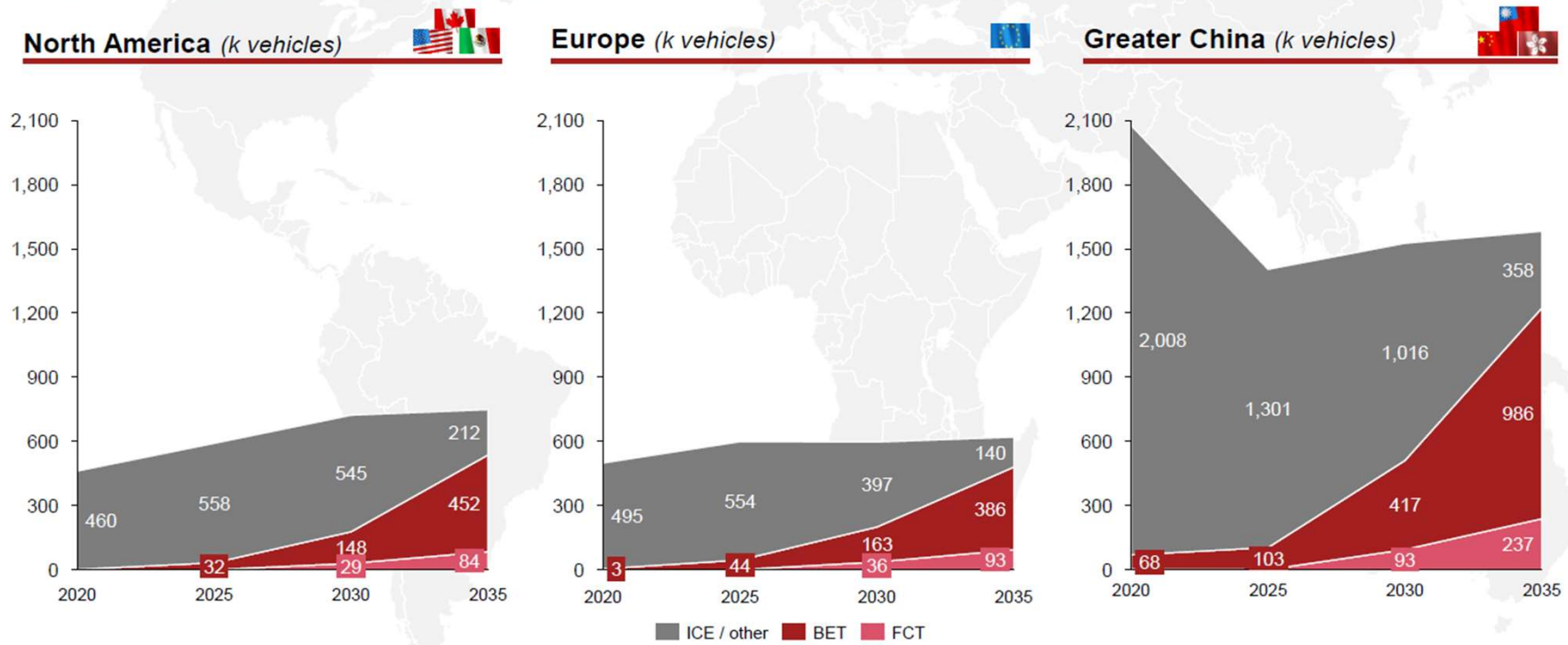
As the world shifts swiftly away from internal combustion engines and into hybrid and electric mobility, the Industrial and Commercial Transportation (ICT) is key to meeting worldwide goals of electrified transport, lowered emissions, and a cleaner planet.



Why are we here?

In 2030, ~900k BET/FCT will be produced in the triad markets – ~200k units in North America & Europe, ~500k units in CN

Truck electrification ramp-up 2020-2035 in selected regions[1]



The dawn of electrified trucking
Strategy&

1) Scope: Production of HD truck, MD truck and bus
Source: Strategy& analysis and IHS Medium Heavy CV Engine Installation (2022).

September 2022
27

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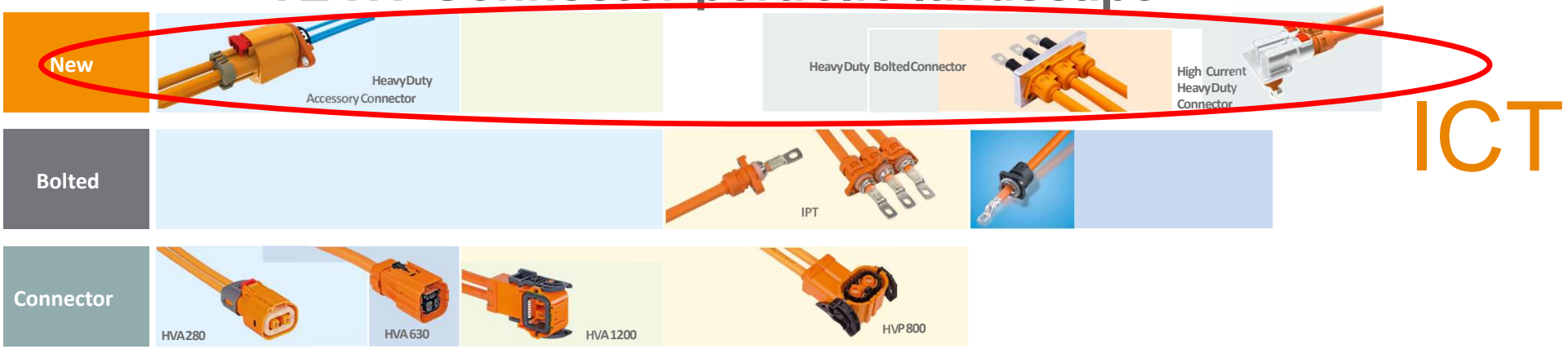
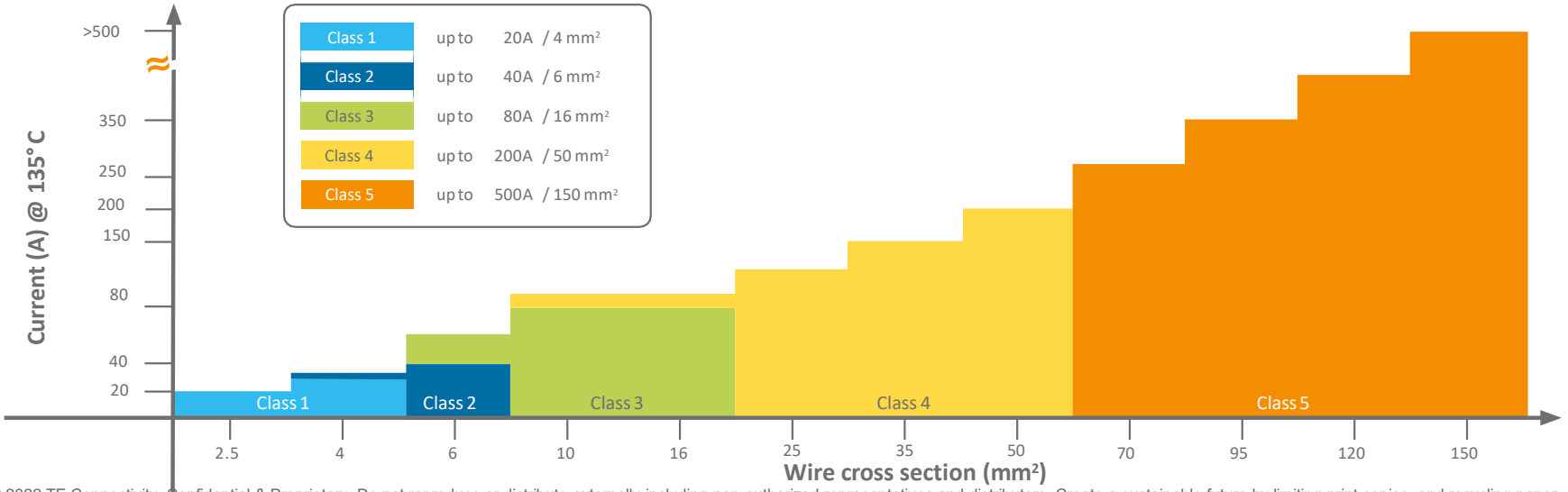
EVERY CONNECTION COUNTS

TE HV Connector portfolio landscape

ICT





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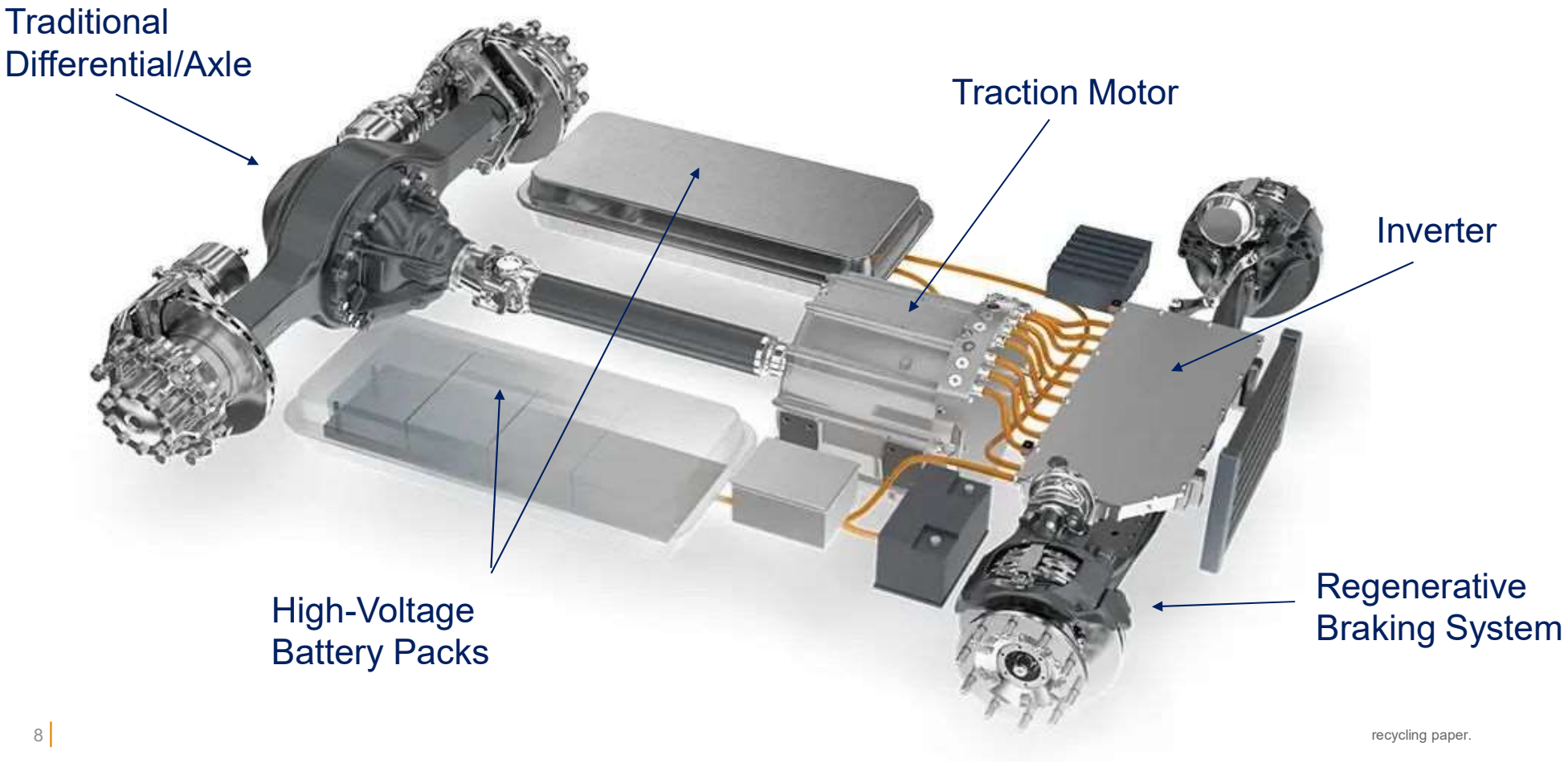
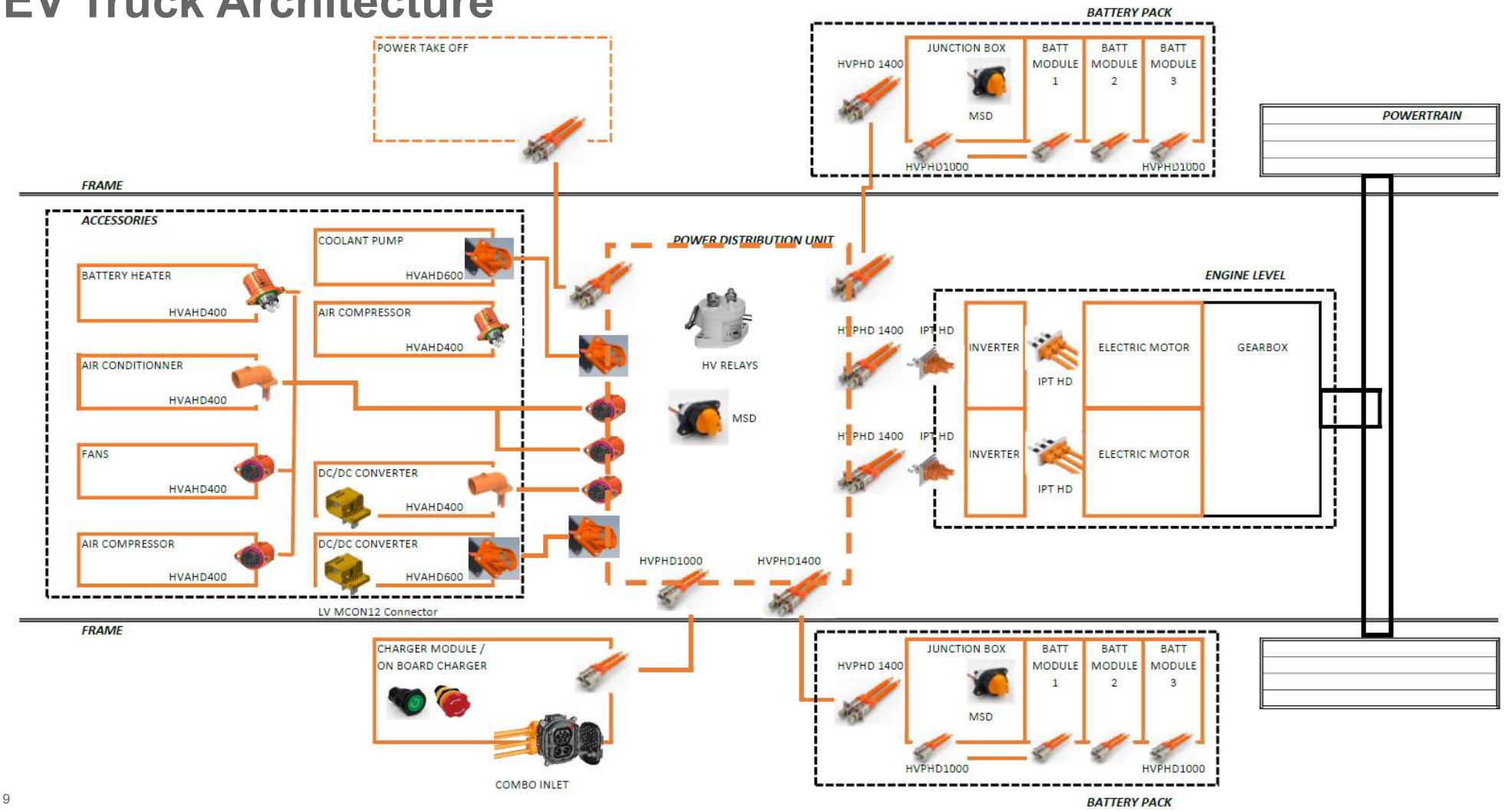
EVERY CONNECTION COUNTS

ICT E-Mobility: Applications - EV Drivetrain (Discrete Motor)



EV Truck Architecture



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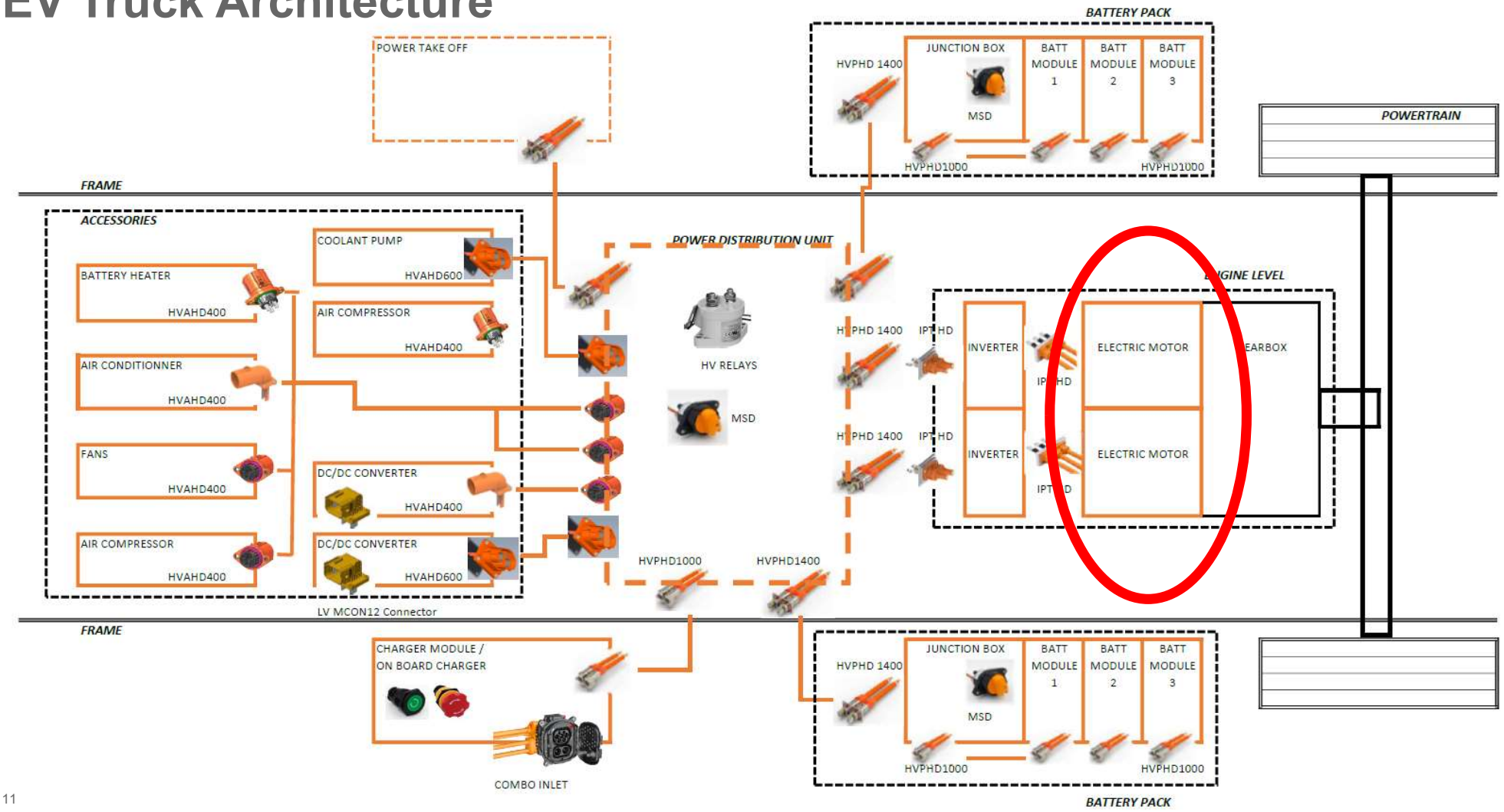
EV Truck Architecture

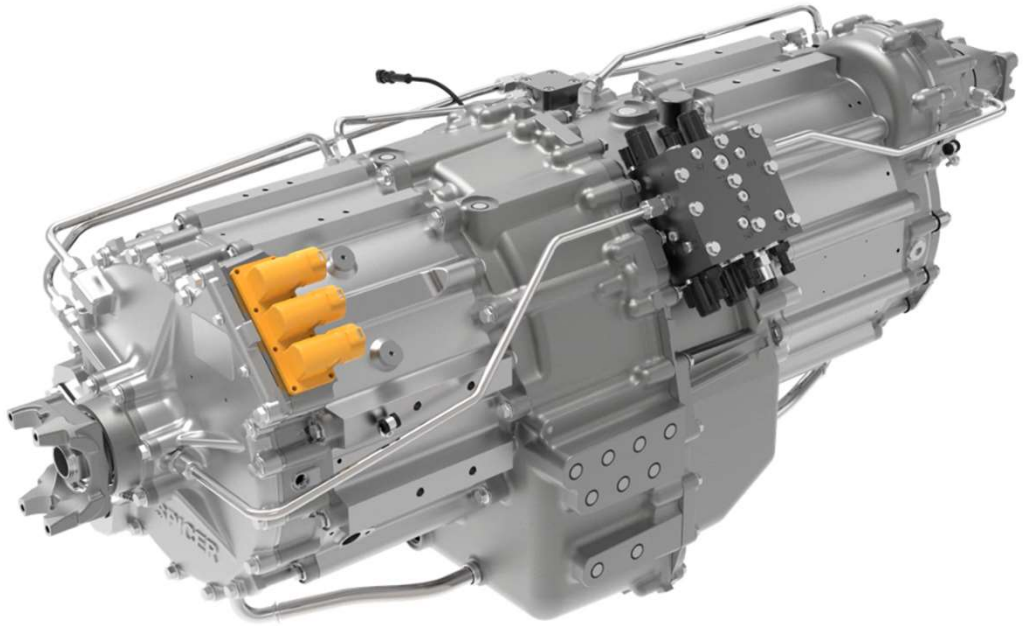


Powertrain eMotor

HIGH VIBRATIONS LEVEL

IPT-HD

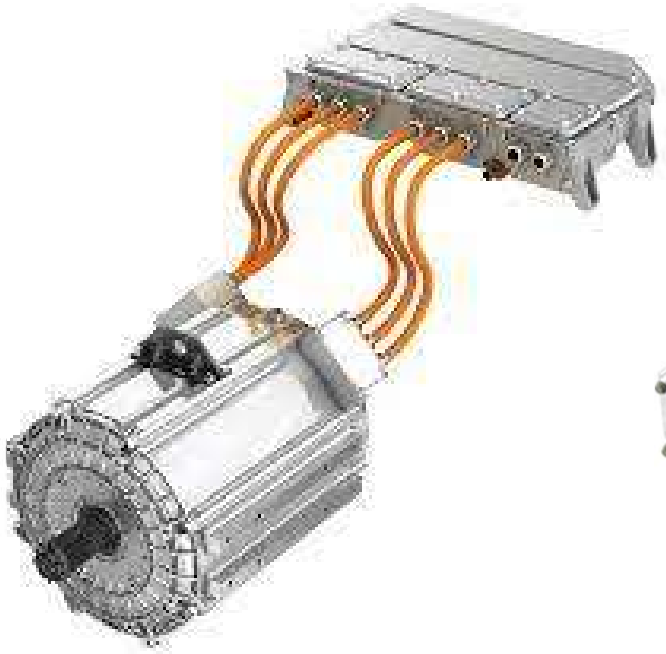
POWERTUBE / HVP HD



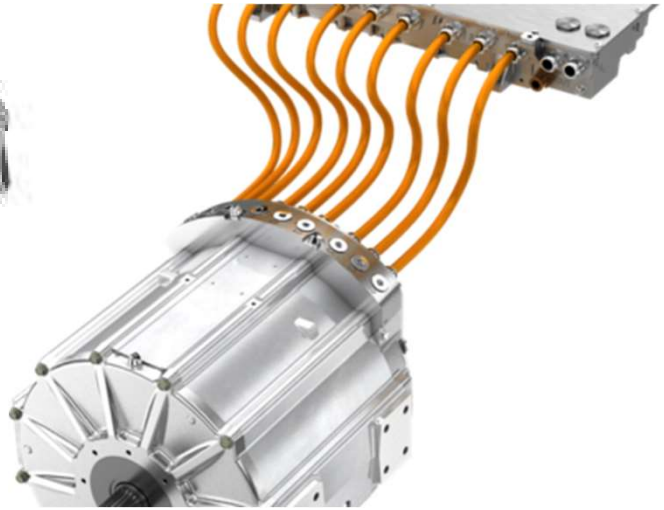
Simple electric motor

3 Phase

6 Phase



9 Phase



IPT HD / BOLTED - Key Benefits

Enhanced EMC Performance

- Low-contact resistance shielding – even after the vibration
- Handles excessive engine-level vibrations
- IP67, IP68 and IP6K9K sealing rated

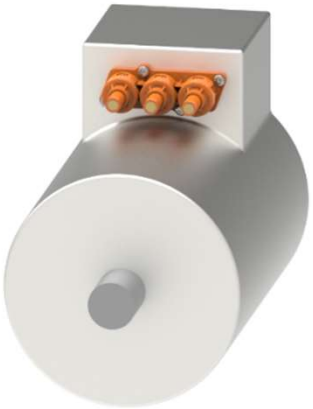
Increased Assembly Efficiency

- Flexible assembly with single wiring harness
- Quick, easy machining of mounting holes

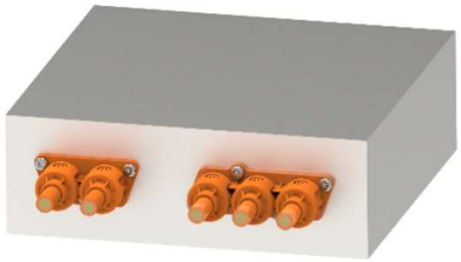
Broader Range of Applications

- 50/70/95mm² conductor cross-sections – 120mm² in dev. (2023)
- ISO compliant / LV216
- MCU(Motor Control Unit), E-axle and E-motor applications

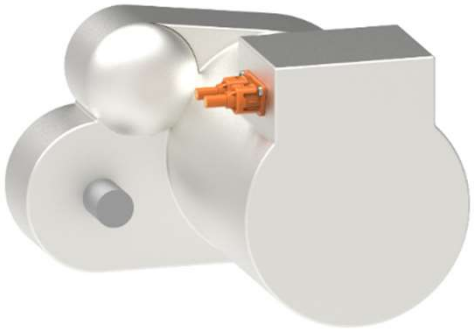
IPT HD / BOLTED - Key Applications



E-Motor



MCU & PDU



E-Axle

IPT HD / BOLTED - Specifications

Operating Temperature:

-40°C~+125°C

Voltage Range:

1000V

Conductor Cross-sections:

50/70/95mm² LV216/(ISO)

Current Carrying Capacity:

250/300/400A @85°C

Vibration Level:

ISO 16750-3 Chassis

LV214-S4/USCAR V3

Fire Classification:

UL94-V0

IP Rating:

IP67, IP68, IP6K9K

Product Specification:

108-160140

Application Specification:

114-160083

Spec Following:

LV214 LV215 IEC 60529

** 95 mm² & ISO cable are in development*

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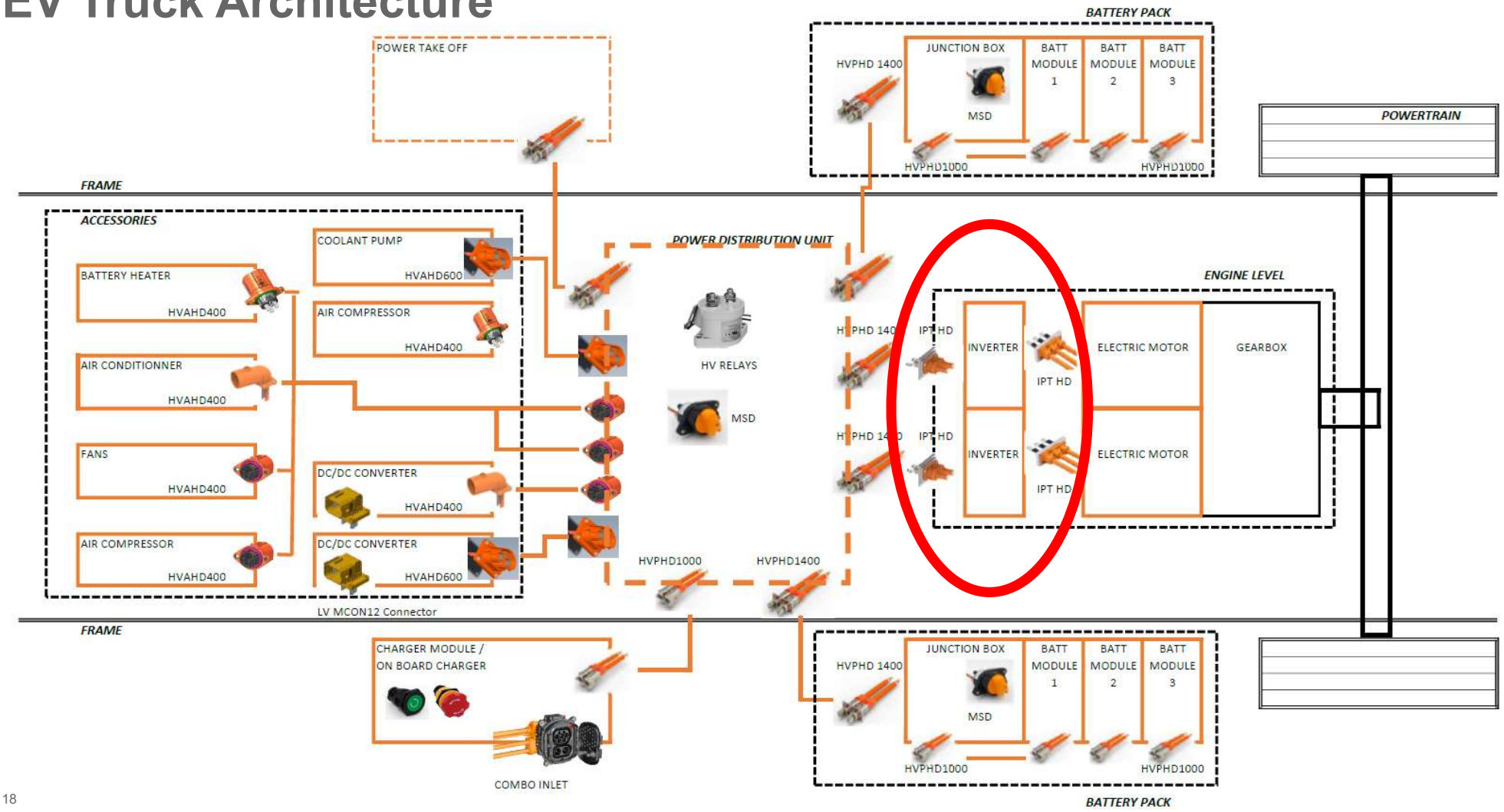
EV Truck Architecture

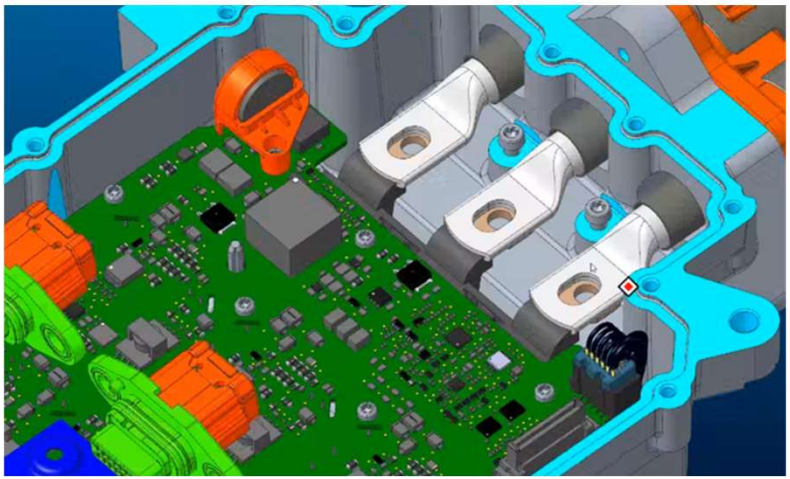


INVERTERS

HIGH VIBRATIONS LEVEL

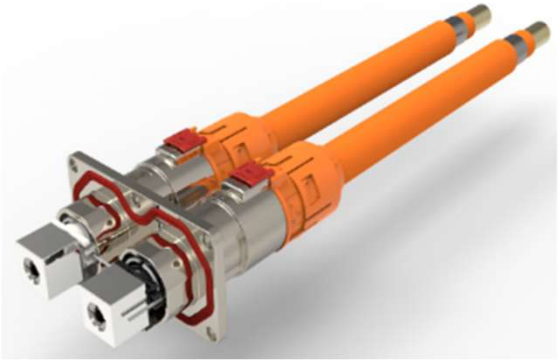
IPT-HD

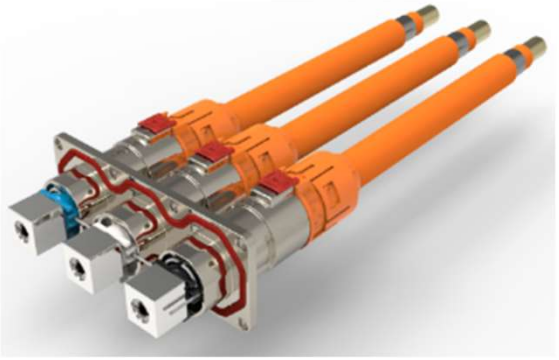
POWERTUBE / HVP HD



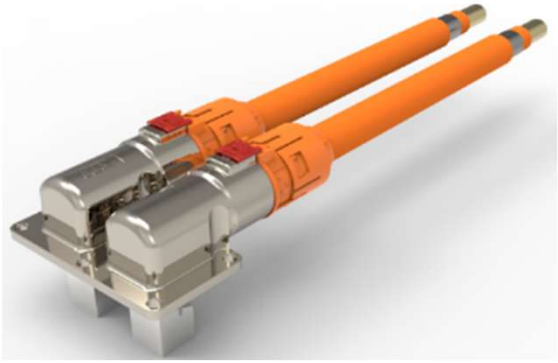
PowerTube Connector System / HVP-HD

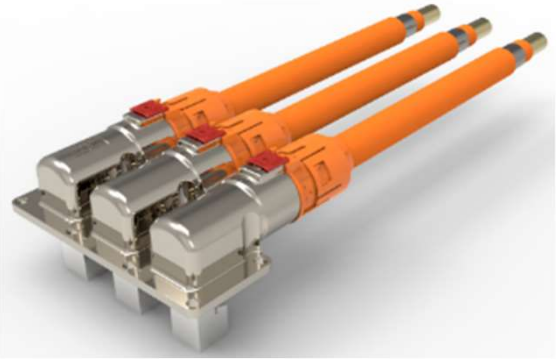
180°





90°





HVP HD - Key Features & Benefits

Full NPI Launch coming in Q1 FY23

High Performance

- IP6K9K protection and ISO 16750-3 profile 7 and 9 vibration performance (commercial vehicle) suitable for engine-level vibration
- Connector Position Assurance (CPA) and High Voltage Interlock Loop (HVIL) for each pin
- Circular 360° shielding provides excellent EMI protection

Modular and Scalable

- Up to 3 pins in one header connector and large cable range
- Cube-shaped bus bar enables multiple screw orientations for easier tool access
- Both 180° and 90° headers use the same size interface on the aggregate
- Unshielded (48 V) and shielded (high voltage) systems can be serviced with the same connector system

Reduced Total Applied Cost

- Modularity reduces inventory cost
- Circular connector design enables simplified wire routing and handling of wires
- Decreases complexity of assembly and reduced number of components
- Single connector design enables improved serviceability in the field

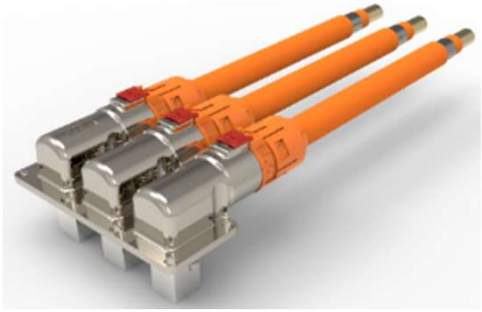
HVP HD - Summary | Key Parameters

Parameter	PowerTube 1000 (HVP-HD 1000)	PowerTube 1400 (HVP-HD 1400)
Voltage level	Up to 1000 V	
Dielectric strength	4000 VDC, 5500 m altitude	
Current level	300 A for connector system (depending on wire size and system temperature)	500 A for connector system (depending on wire size and system temperature)
Terminal size	10 mm round pin	14 mm round pin
Wire size	35 mm², 50 mm², 70 mm²	70 mm², 95 mm², 120 mm², 150 mm²
Shielding	360°shielding (shield current up to 30% of main current)	
Vibration	ISO 16750-3 profile 7 and 9 (commercial vehicle)	
PIN count	1/2/3 pin on header side, 1 pin on connector side	
Orientation	180° and 90°	
IP level	IP67, IP6k9k, IPX8	
Safety	HVIL for each pin, IPXXB, IPXXD	
Coding	12 color codings	
Corrosion resistance	VDA233-102 salt spray test	
Others	CPA, tool and finger access	
Application specs	114-160181 REV2 114-160182 REV2	114-160222 REV3 114-160223 REV3
Product spec	108-160341 REV2	108-160407 REV3

HVP HD - High Performance

High current performance for all power systems – up to 1000 V

Wire Size	Current	Ambient Temp.	Duration
120 mm²	500 A	70°C	continuous
		80°C	60 min
120 mm²	650 A	50°C	35 min
		70°C	20 min
		80°C	15 min
120 mm²	900 A	50°C	10 min
		70°C	6 min
		80°C	4 min

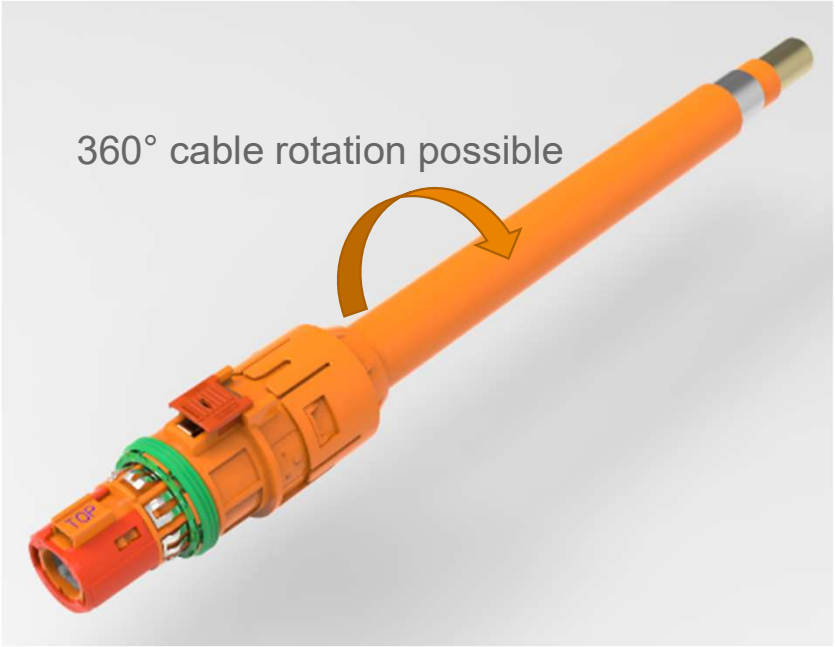


HVP HD - Modular and Scalable

One pin connector configuration, one plug orientation

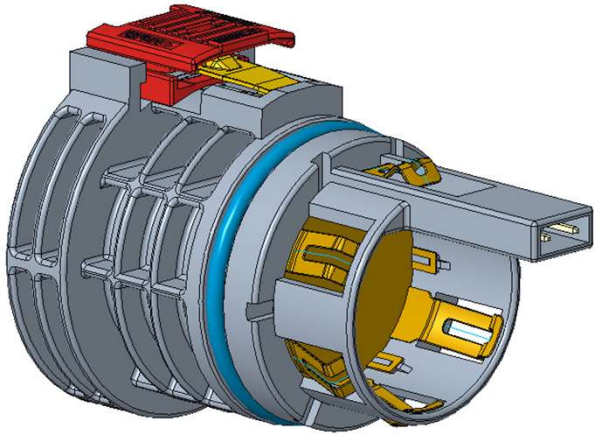
- Design for manufacturing / easier wire routing
- No orientation for termination required
  - Connector housing rotation after final assembly (360°)
- Improved serviceability (exchange single cable)
  - TPA/ coding can be exchanged

Rotation of plug (as cable is fixed during assembly) is possible until plug will get mated with header (you can’t rotate it the other side)

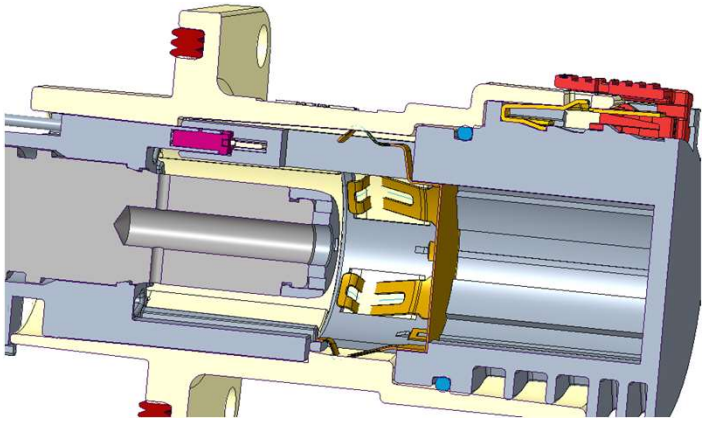


HVP HD - BLIND PLUGS

Available for 1000 and 1400 versions



Assembly View

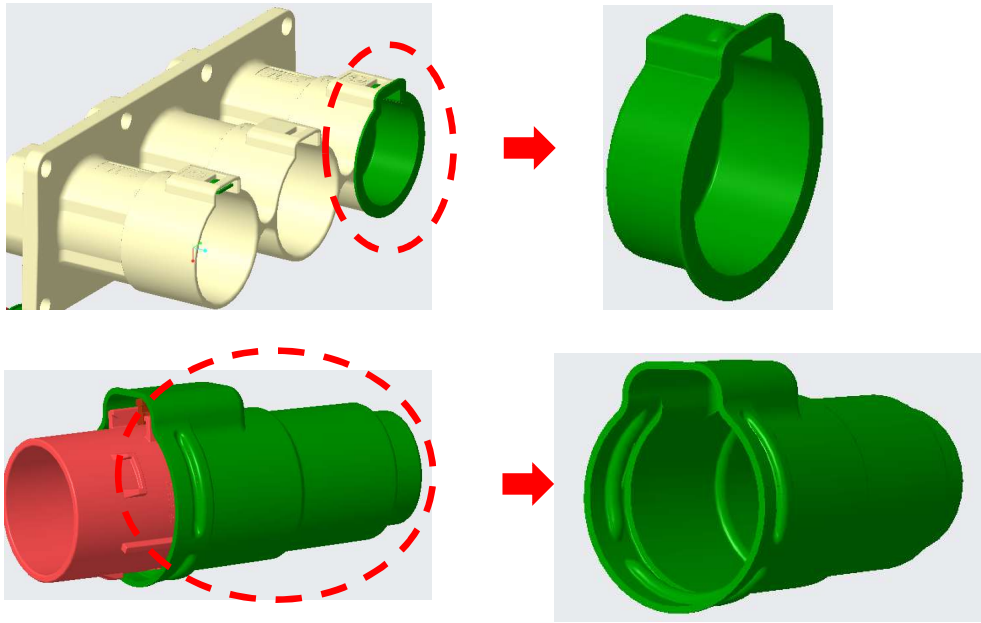


Mating Section View

HVP HD - SHIPPING CAPS

Prevent the terminal & sealing area from being touched during transportation

- One time use of shipping cap
- Simple plastic component, blow-molded
- To be removed right before assembly
- No IP degree



HVP HD1400 - Electromagnetic Pulse Technology (EMPT)

Introduction

The electromagnetic pulse technology (EMPT) provides non-contact processes for joining, welding, forming and cutting of metals by application of strong, short pulsed magnetic fields.

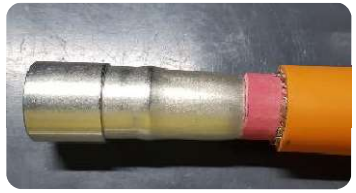
Fundamentals of the Electromagnetic Pulse Technology (EMPT)

A current-loaded conductor suffers a force, when being placed in a magnetic field. This Force is called Lorenz force to honor Hendrik Anton Lorentz, who first analyzed it. In case the magnetic field is generated by a parallel lined second conductor, both conductors will attract themselves when current is running in same direction and repel when current direction is opposite in both wires. Projecting this phenomenon onto an electrical conductive tube cross-section placed inside a coil, the coil represents one conductor, whereas the tube is the second one. If the coil is now loaded by an altering current, an opposite current flow is induced into the tube according to Lenz's rule. Induced current and coil current are by this running in opposite direction and thus generating a repellant force, compressing the tube's diameter.

Bus bar:
Material-locking connections between aluminium and copper or silver-plated or nickel-plated copper, since no thermal energy is introduced. *(PSTproducts GmbH)*

Aluminium pressure vessel:
Process-safe, high-strength and helium-tight welded. *(PSTproducts GmbH)*

Cable lug connection:
Remark: Series component; Several components can be joined simultaneously with one pulse .
(PSTproducts GmbH)



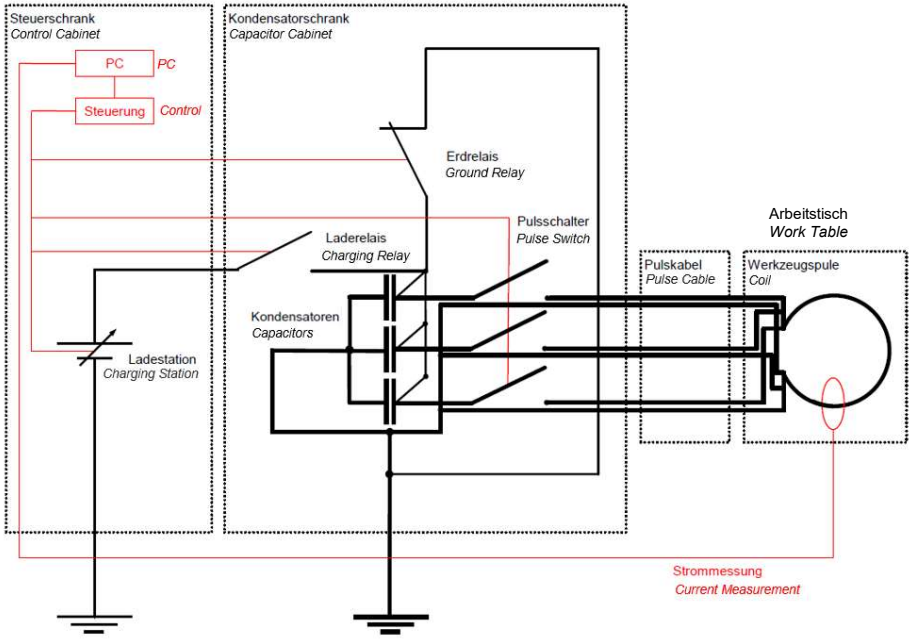
NewTE cable connection
Connector Type:
POWERTUBE 120mm²

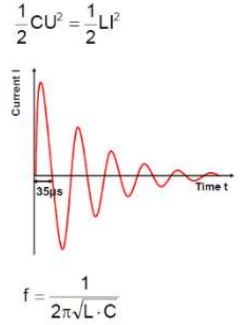
Reference: PSTproducts

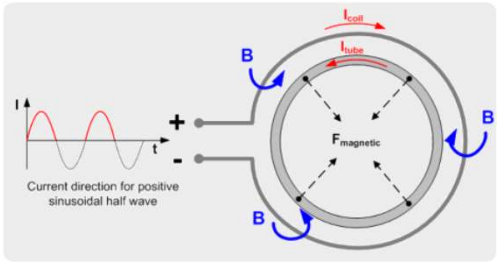
Electromagnetic Pulse Technology (EMPT)

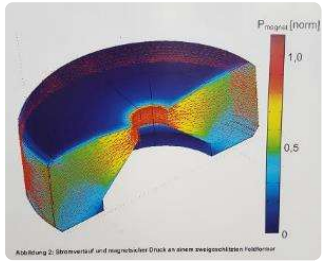
In simplified terms, the EMPT is based on the principle that **pulsed current is applied to a tool coil**, which indices an opposing current in a workpiece with a good electric conductivity. The coil current and workpiece current repel each other and the resulting force is used for forming.

For the effective use of the magnetic forces during forming, the distance from the coil to the workpiece must be as small as possible. In order to still be able to use the same coil with different workpiece dimensions, field shapers (field former) are used which make it possible to concentrate the electromagnetic force on certain areas of the workpiece.









Reference: PSTproducts

Electromagnetic Pulse Technology (EMPT)

Samples after pulse:

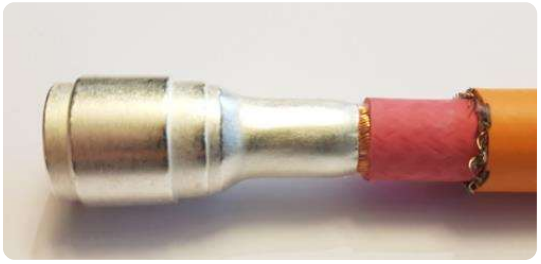
Contact: 120mm²

Contact: 95mm²

Contact: 70mm²

- *crimped w/o cable*
- *max. deformation w/o visible cracks*
- *EMPT process don't have a hard cut → the magnetic field weakens with increasing distance from the crimp area*
- *even power deformation around the contact zone (with the same geometry)*

Contact: 70mm²

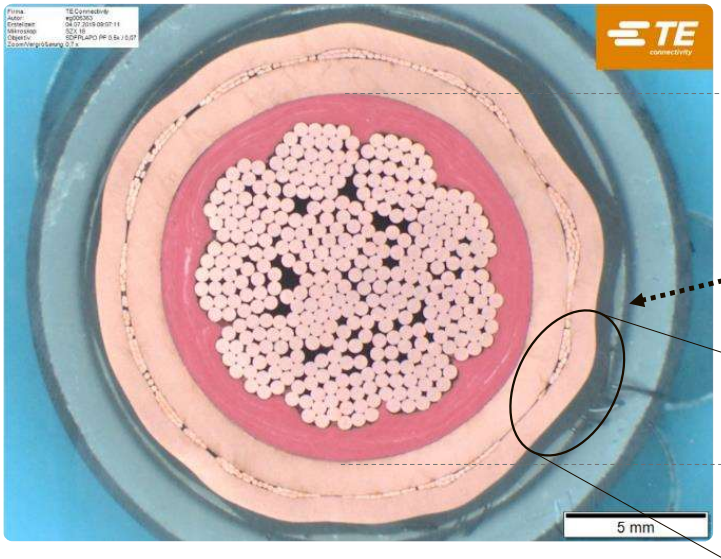


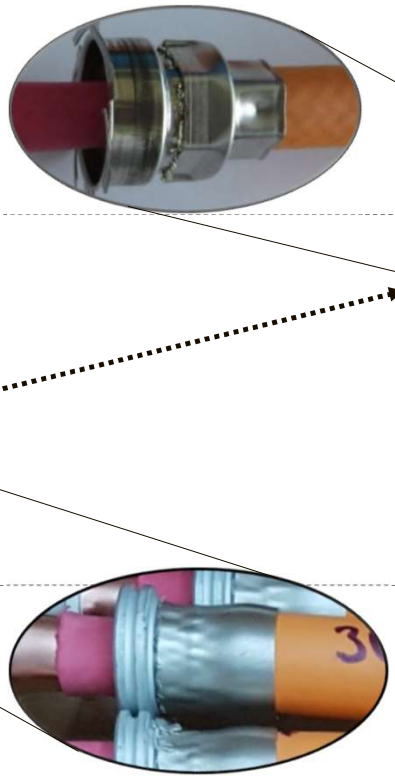
Shielding

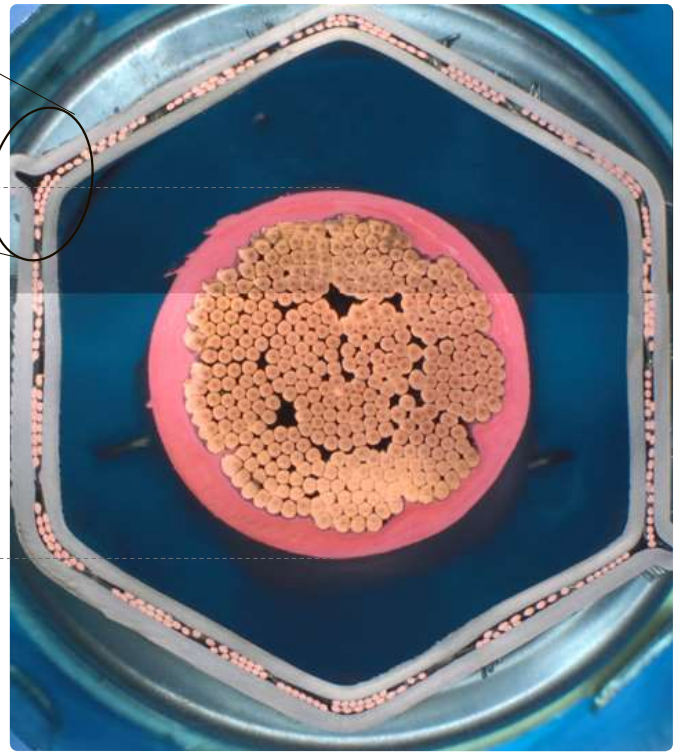
Electromagnetic Pulse Technology (EMPT)

Optical Evaluation:

Cross section, shield pression vs hexa-crimp







- Visible and mechanical pression of the shield strand
- Height compression level (on a much smaller circumference)
- Optimal conditions, 360° for shielding.

- Only insufficient visible and mechanical pression of the shield strands (especially at the corners).

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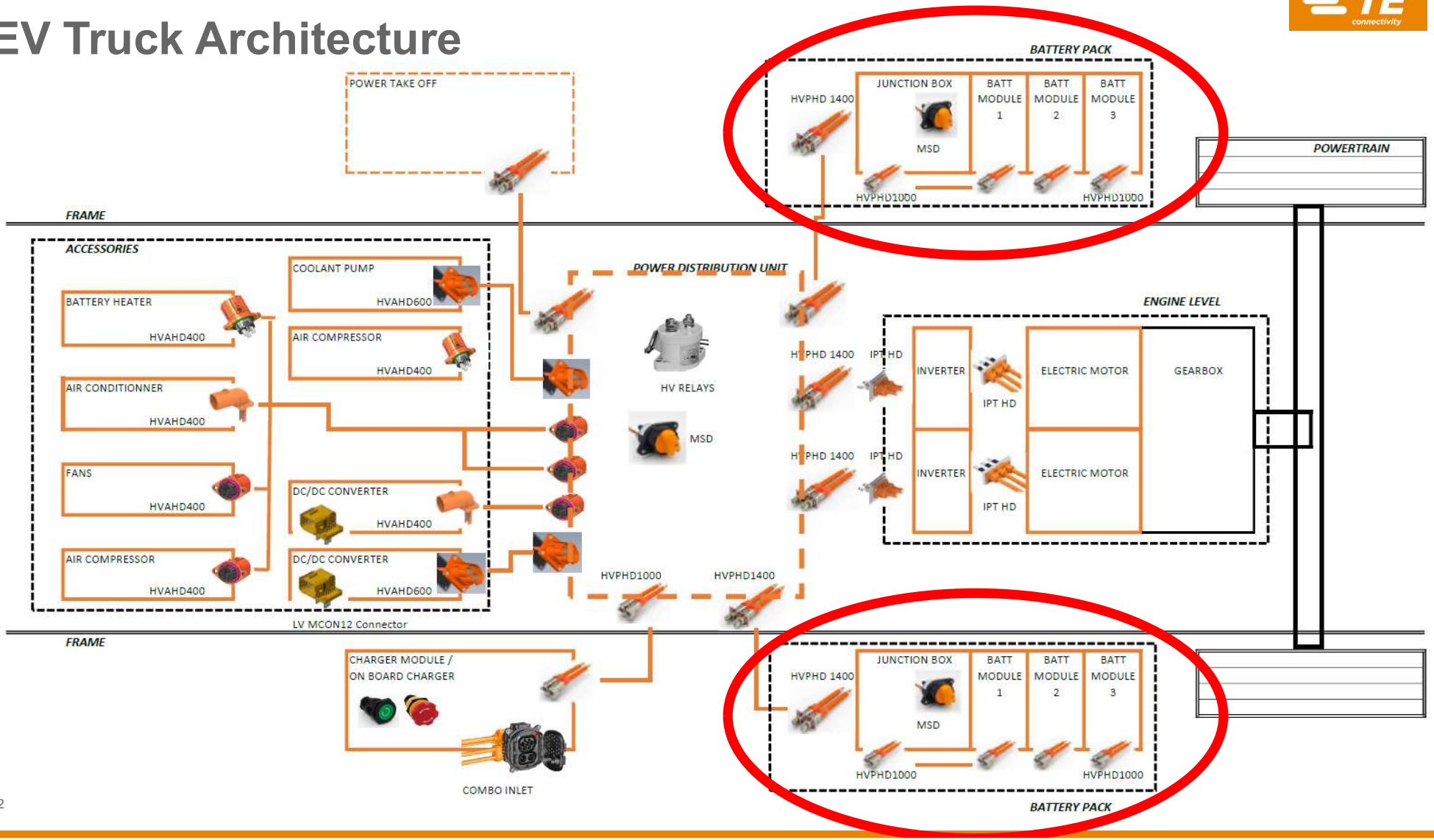
EV Truck Architecture

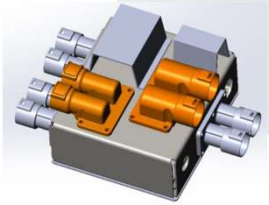


BATTERY PACKS

CHASSIS

MODULES: *HVP-HD1000*

BOX:
HVP-HD1400
MSDs



KISSLING HIGH VOLTAGE SOLUTIONS

Series 35H – HV Battery Disconnector

HIGH VOLTAGE

- sealed housing meets IP6K9K standard
- applicable with continuous current of up to 550 A
- maximum contact voltage of up to 1,000 VDC

(@7,000 m)

- -40 °C to +85 °C operating temperature range
- auxiliary contact for querying the switching positions optionally available
- auxiliary contact options include DIN connectors and cable connections
- high voltage resistance of 2,000 V - 1 min

BATTERY PACKS

Manual Service Disconnect

High performance. Reliability. Safety. You can count on the new manual service disconnect (MSD) provided by TE Connectivity (TE) for your hybrid and electric vehicle battery pack and power distribution unit application needs. This newly designed MSD meets United States Council for Automotive Research (USCAR) standards.

Provided with a fuse and featuring a maximum continuous current rating of 240 amps, the MSD is available in several versions, each rated at different current levels, to meet design specific requirements. The different rated MSD are coded to help prevent operation errors. Voltage for the MSD can reach 800 volts, meeting the requirements of nearly all applications in the industry.

Our high-performance MSD is IP67/IP6K9K rated and designed to withstand the challenges of harsh environments. A high voltage interlock loop (HVIL) is integrated into the MSD to help prevent electrical arcs from occurring during mating and unmating. The MSD' s innovative IPx2B design helps prevent fingers from touching the conductor, increasing safety.

Performance parameters:

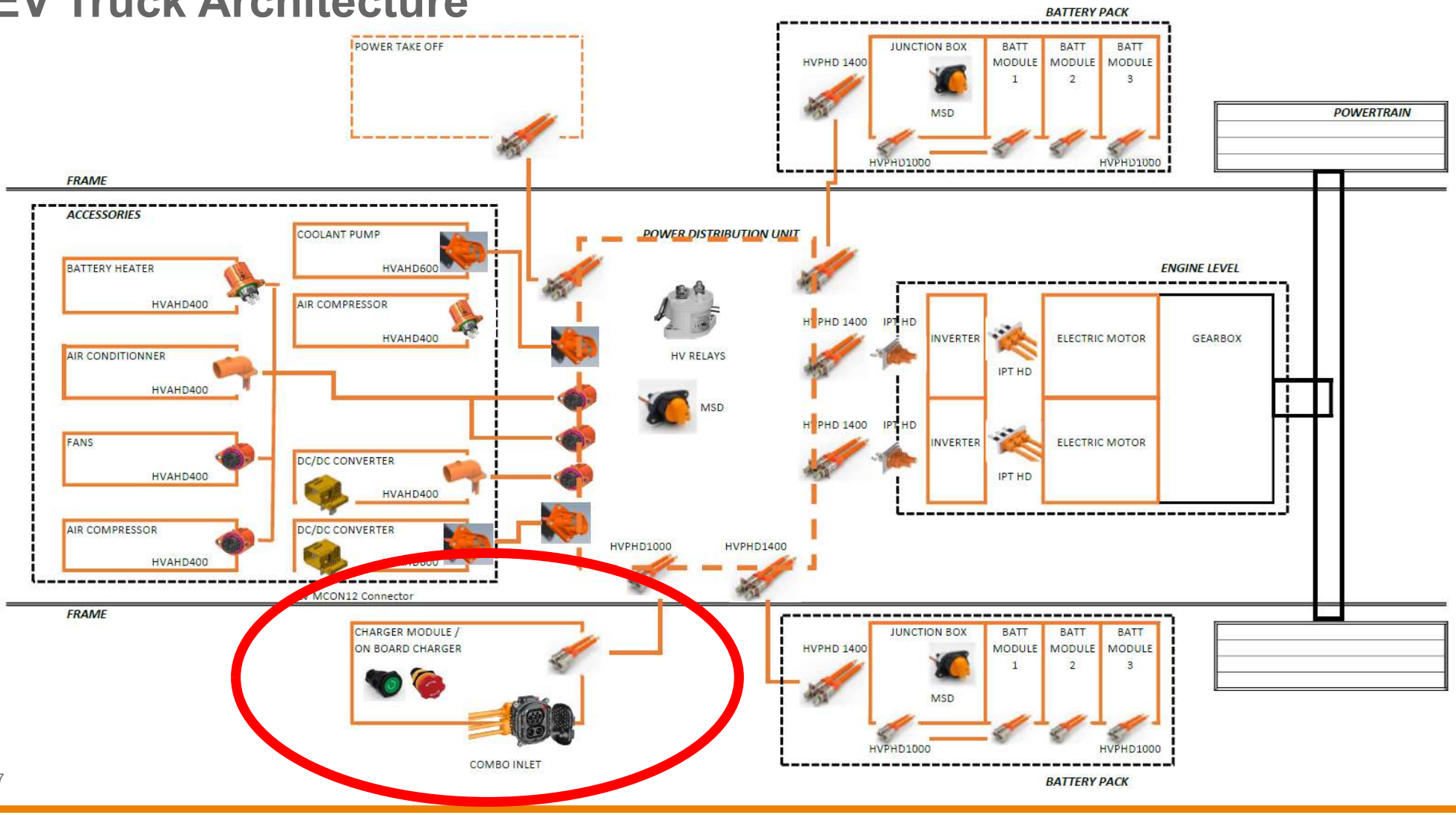
- Operating temperature: -40–65 °C
- Rated voltage: 800 V
- Rated (Continuous) Current: 240A Maximum
- Fuse Ratings: 200A – 630A (depending on application)
- HVIL design: Yes
- IP Rating: Mated: IP67/IP6K9K
  Unmated: IPx2B
- Product specification: 108-101601
- Application specification: 408-101003/408-101004

Agenda

- **Why are we here?**
- **Product Overview**
- **EV Architecture**
- **Applications**
  - E- MOTOR
  - INVERTER
  - BATTERY PACKS
  - CHARGER
  - POWER DISTRIBUTION UNIT / BOX
  - ACCESSORIES
    - FANS
    - PUMPS / COMPRESSORS
    - THERMAL MANAGEMENT
    - DC/DC CONVERTERS

EVERY CONNECTION COUNTS

EV Truck Architecture



CHARGER

CHASSIS

CONNECTORS: *HVP-HD*

BOX: COMBO INLETs

Types of Charging Inlets

AC only

AC+DC

AMP+ Charging Inlets Generation 2

Types & Markets Overview

AMP+ Charging Inlets Generation 2

Performance Overview





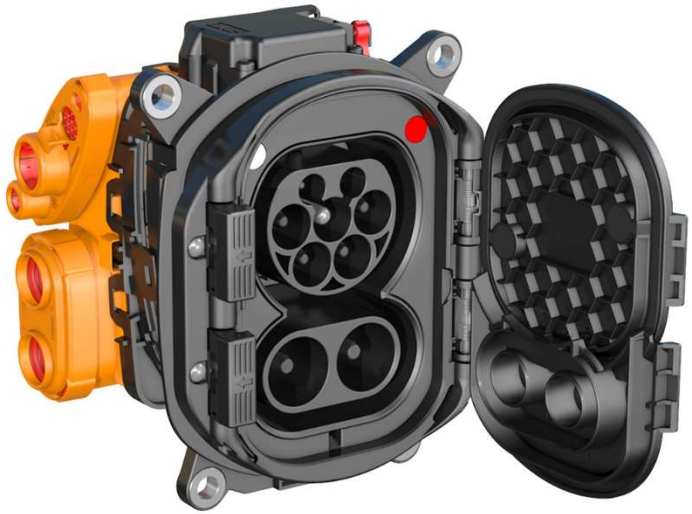

	Type 1	Type 2	GB AC	CCS 1	CCS 2	Japan DC[2)]
Applicable Standard	SAE J1772 (IEC 62196-2)	IEC 62196-2	GB/T 20234.2	IEC 62196-3	IEC 62196-3	IEC 62196-3 JEVS* G105-1993
Max. Rated Current						
AC Path	40 A	63 A	63 A	40 A	63 A	–
DC Path	-	-	–	200 A	200 A	200 A
Max. Rated Voltage						
AC Path	250 V	480 V / 250 V	440 V / 250 V	250 V	480 V / 250 V	–
DC Path	-	-	-	600 V	1.000 V	600 V
TE GEN2 Performance						
Max. Rated Current						
AC Path	32 A	32 A	32 A	32 A	32 A	–
DC Path	-	-	-	200 A	200 A	200 A
Max. Rated Voltage						
AC Path	250 V	480 V / 250V	440 V/ 250 V	250 V	480 V / 250 V	–
DC Path	-	-	-	600 V (1.000 possible)	1.000 V	600 V

2) Japan DC: Restricted sales

Evolution to High Power Charging (HPC) CCS Inlet 500A continuous

Available:
- 50mm² **200A** DC @ 35°C
- 70mm² **200A** DC @ 50°C (Kits + Pigtail) with LED
- 95mm² **335A** DC / 500A (burst/cooled pistol)

Next:
- 120mm²
- CCS 1 and CCS 2
- with LED
- DC connection via ultra-sonic welding
- **500A** DC continuously
- → SOP Sep 2023
- 80A AC charging Sep 2023



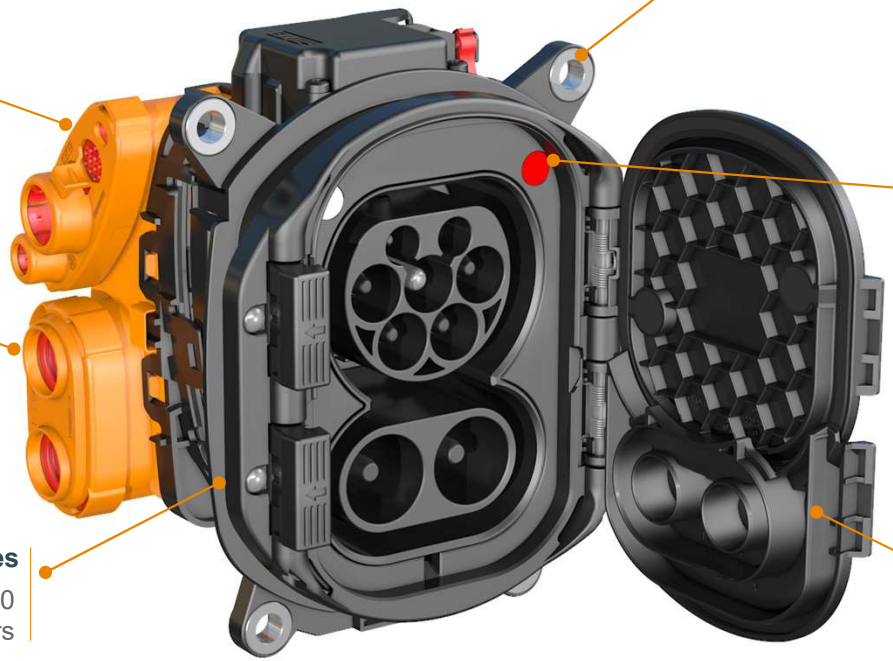
New ICT Charging Inlet Features

Future-Proofing

Standard mounting to ensure compatibility with future generations

Modularity

Configurable cable exit directions for added adaptability



Visual Charging Confirmation

Optional LEDs to show charging status

Faster Charging

Thicker conductors for higher power for longer periods, bringing fast charging to commercial transportation

Enhanced Safety Features

3 integrated PT1000 temperature sensors

Environmental Protection

Optional flaps for additional configurability and protection from the elements

Key Features & Benefits

Modular design

- Cable exits to left and right side
- Optional LED charging indicator for end-user ease of use
- Protective flaps - choice of opening direction

ICT-specific features

- Capable of 10,000 mating cycles, while charging at 250 VAC (at 32 A), and 1000 VDC (at 200+ A)
- Larger cable sizes than what's seen in the Automotive market – DC 70 mm² / PE 25 mm² / AC 6 mm²
- Enhanced safety features: integrated actuator for end position sensing, integrated PT1000 temperature sensors for enhanced temperature monitoring

Supply chain convenience

- Pre-made kits available from TE and key distributors
- Pigtail cable assemblies available in 1.5 m or 3 m lengths

Charging Inlets Technical Data

Operating Temperature:

-40°C to +85°C

Voltage Range:

250 VAC

1000 VDC

Conductor Cross-Sections:

DC 70 mm² / PE 25 mm² / AC 6 mm²

Current Carrying Capacity:

32 A (AC), 200+ A (DC)

Codings:

CCS1 and CCS2

IP Rating:

IP67

Product Specifications:

Coding	Without LED	With LED
CCS1	108-94803	108-94838
CCS2	108-94804	108-94839

Application Specifications:

Coding	Without LED	With LED
CCS1	114-94674	114-94722
CCS2	114-94675	114-94723

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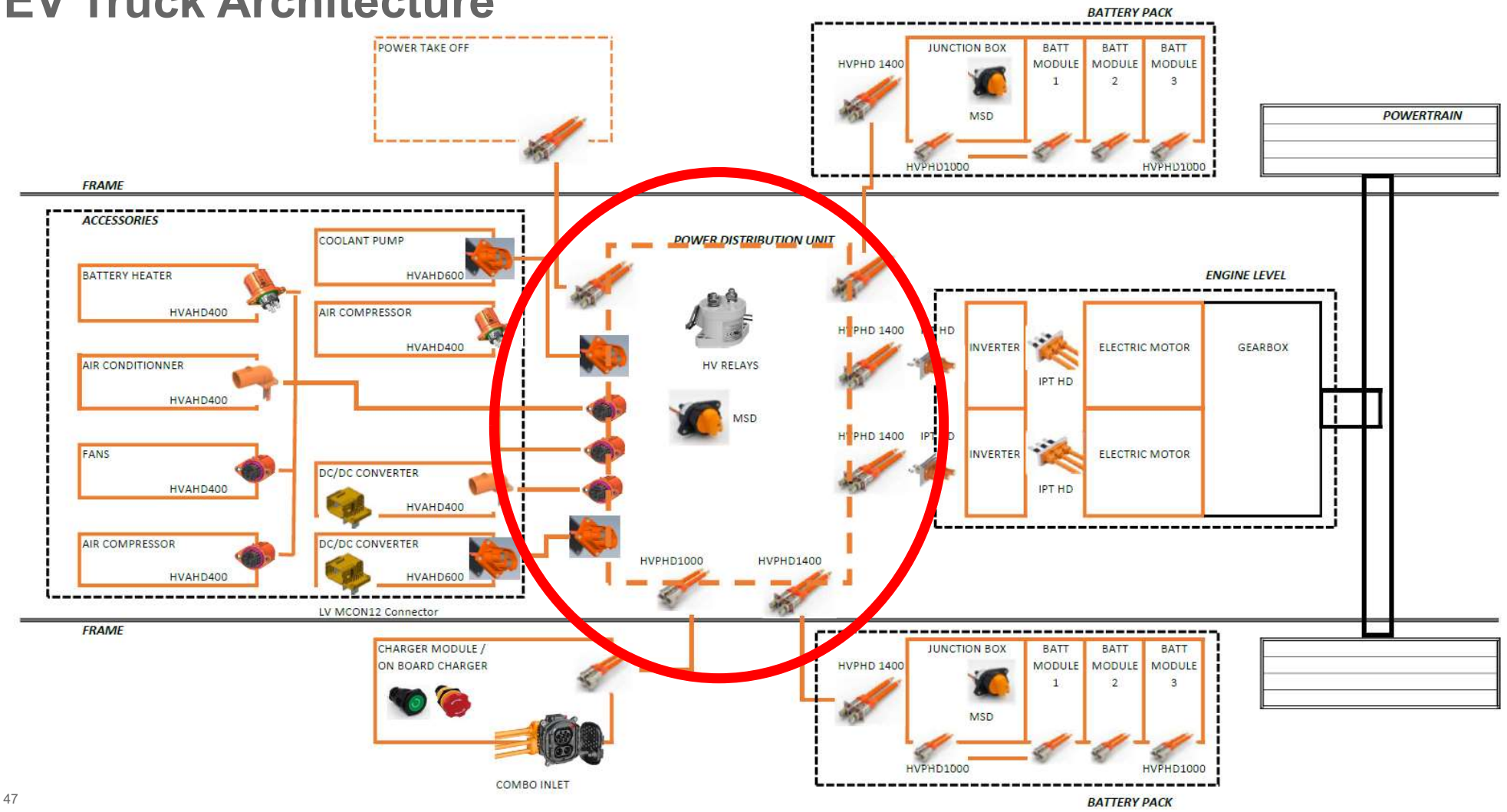
  - ACCESSORIES
    - FANS
    - PUMPS / COMPRESSORS
    - THERMAL MANAGEMENT
    - DC/DC CONVERTERS

EVERY CONNECTION COUNTS

EV Truck Architecture



PDU PDB

CHASSIS

CONNECTORS:
HVP-HD1000 / HVP-HD1400
HVA-HD400 / HVA-HD600

PCB:
HV RELAYS
HV SWITCH

KISSLING HIGH VOLTAGE SOLUTIONS

Series 60 –High Voltage Relay

- main contacts designed for continuous load and 100% duty cycle
- up to 200.000 switching cycles at rated load
- minimum 2 million mechanical operations
- maximum voltage range of up to 800 VDC
- efficient coil & magnetic field design with optimal switching characteristics and minimal holding current requirements
- powerless control input for direct connection to an ECU
- electronic status output

HIGH VOLTAGE

Relays for Hybrid & Electric Vehicles

- **Main Contactors**
- **Precharge Relays**
- **Charger Contactors**
- **Auxiliary load contactors**

- Up to 6kA short circuit capability
- Small size, light weight
- 2nd generation contactors without gas filling

	 Mini K HV Precharge Relay	 EVC 50 Contactor[1)]	 EVC 80 Contactor[1)]	 EVC 135 Contactor	 EVC 175 Main Contactor	 EVC 250 Main Contactor	 EVC 500 Main Contactor
Load voltage/ V	450	450	450	450	450	450 / 800	450
Carry short circuit current/ kA	0.02	0.5	0.9	2.0	5.0	6.0	3.5
Continuous rated current (carry)/ A	-	50 (20 mm² cables)	80 (20 mm² cables)	135 (35 mm² cables)	175 (35 mm² cables)	250 (50 mm² cables)	500 (200 mm² cables)
Emergency break current/ kA	0.02	0.4	0.4	1.0	1.2	2.0	1.5

1: all data preliminary

	(EV) OEM/Commercial &Electric Vehicle				(LEV) Industrial Commercial	
Product Series	**EV200A**	**EV200B**	**EV200P**	**EV100**	**LEV100**	**LEV200**
Main Contact Data						
Continuous Current	500	500	500	100	100	500
Contact Voltage Range	12-900	12-900	12-900	12-900	900	12-900
Electrical Life at Rated Current, 270 Vdc, Resistive Load	1,000	500	500	6,000	6,000	1,000
Overload (Make/Break) @ 350 Vdc	650/2000	650/1000	650/1000	600/1000	600/1000	650/2000
Rupture (Break only) @ 350 Vdc	2000	1000	1000	1000	1000	1000
Contact Arrangement	SPST	SPST	SPST	SPST	SPST	SPST
Contact Form	X(NO)	Y(NC)	X (LATCH)	X(NO)	X(NO)	X(NO)
Contact Resistance @ Rated Current	0.2	0.2	0.2	0.2	0.2	0.2
Auxiliary Contact Data						
Contact Form/Quantity of Sets (Max.)	Form A/1	Form A/1	Form A/1	None	Form X/1	Form X/1
Current Rating @ 30 Vdc (Ag/Au), Max.	2.0/0.1	2.0/0.1	2.0/0.1	2.0/0.1	2.0/0.1	2.0/0.1
Minimum Signal Level	g 6V/15mA u 5V/5mA	Ag 6V/15mA Au 5V/5mA	Ag 6V/15mA Au 5V/5mA	—	—	Ag 6V/15mA Au 5V/5mA
Dielectric Withstanding Voltage						
Contacts to Coil to All Other Points	2,200	2,200	2,200	2,200	2,000	2,200
Insulation Resistance						
Initially @ 500 Vdc	100	100	100	100	100	100
At End of Life @ 500 Vdc	50	50	50	50	50	50
Environmental Data						
Operating Temperature Range	40 to +85	-40 to +60	-40 to +85	-40 to +85	-40 to +85	-40 to +85
Storage Temperature Range	65 to +125	-65 to +125	-65 to +125	-65 to +125	-65 to +125	-65 to +125
Shock, 11ms, 1/2 Sine	20	30 (Closed)/ 10 (Open)	30	20	20	20
Vibration, Sine (55-2,000 Hz)	20	10	20	20	20	20
Coil Transient Suppression	Yes	Yes	No	Yes	No	No
Mechanical Data						
Operate Time @ 25°C (Including Bounce), Max./Typ.	25/15	25/15	25/15	25/15	25/15	25
Release Time, Max.	12	15	15	15	10	15
Bounce Time, Max.	7	5	5	5	5	5
Mechanical Life, Min.	1,000,000	100,000	100,000	1,000,000	1,000,000	100,000
Weight (Nominal)	0.95 (.43)	0.95 (.43)	.99 (.53)	.28 (.130)	0.42 (.19)	1.3 (.60)
Coil Voltage (Nominal)	9-36	12/24	12/24	9-36	12/24/48	12/24/48

KILOVAC portfolio

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    - FANS
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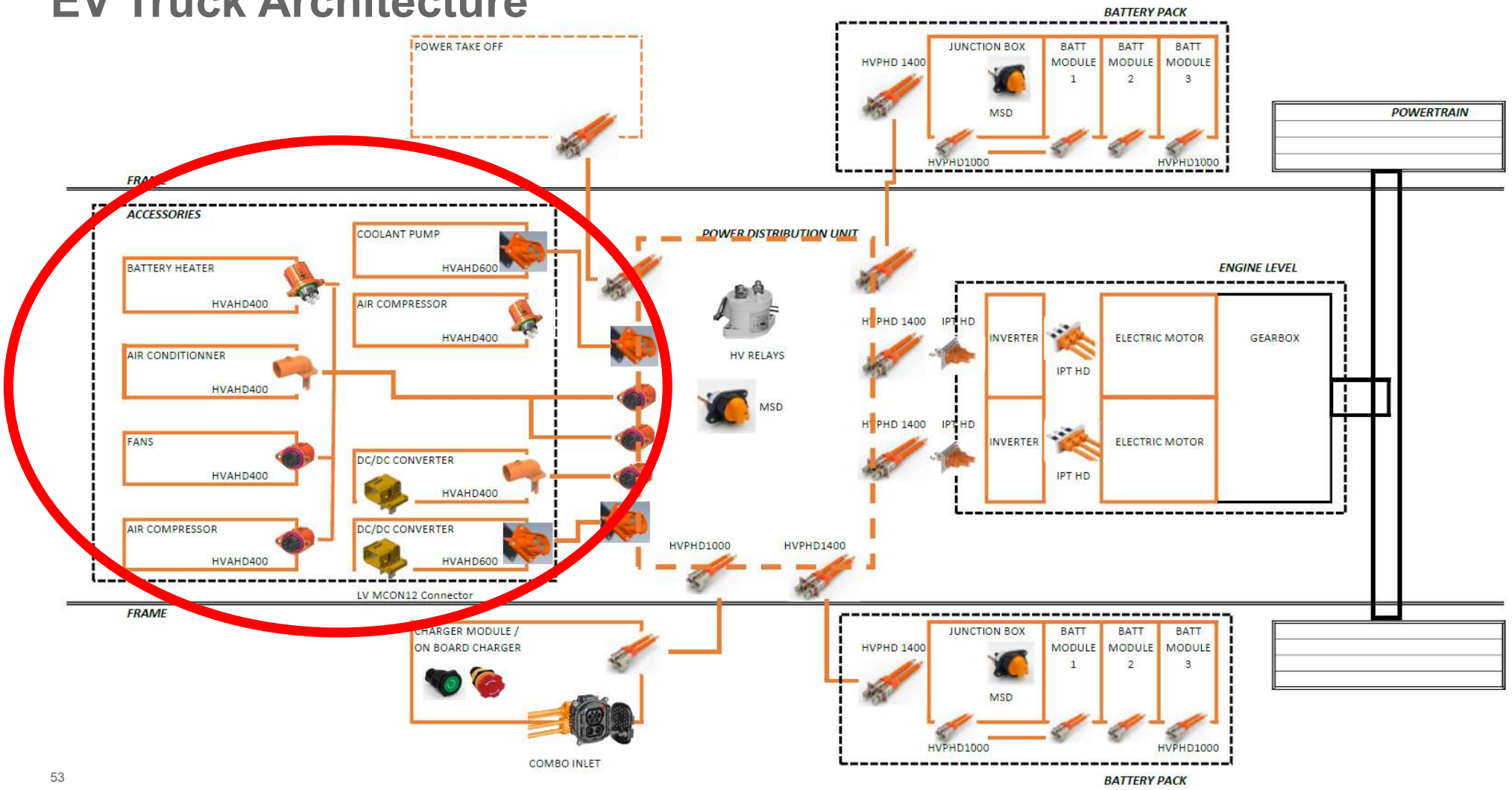
    - THERMAL MANAGEMENT
    - DC/DC CONVERTERS

EVERY CONNECTION COUNTS

EV Truck Architecture



ACCESSORIES

CHASSIS

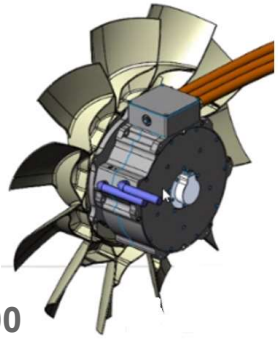
HV CONNECTORS:
HVP-HD1000
HVA-HD400
HVA-HD600

LV CONNECTORS:
MCON12

HV PUMP HVA-HD600

DC/DC converter HVA-HD400

THERMAL MANAGEMENT HVA-HD400



HV FAN HVA-HD400

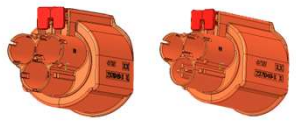
Key Features & Benefits

High-Level Performance

- Capable of handling up to 1000 VDC and 60 A (at 80°C)
- Can withstand transmission-level vibrations
- Contact position assurance (CPA) for additional security
- IP68/IP6K9K ratings, sand and dust protection on lock structure for protection from the elements
- High EMC performance

Form AND Function

- 2 or 3 positions in the same interface for compact design
- Convenient design for high volume applications requiring cable assembly automation



Adaptability

- Designed for use with nearly any high voltage accessory in the vehicle
- Wide array of cable sizing: can handle 2.5, 4 and 6 mm² LV216 conductor cross-sections single-core cabling (multi-core and ISO cabling on the way)

HVA HD400 Technical Data

Operating Temperature:

-40°C to +140°C

Voltage Range:

1000 VDC

Conductor Cross-Sections:

2.5/4.0/6.0 mm² LV216/(ISO)

Single-core (multi-core coming soon)

Current Carrying Capacity:

60 A @80°C

Vibration Level:

LV214-S3

ISO 16750-3 Chassis (ongoing validation)

Cavity:

2 or 3

Fire Classification:

UL94-V0

IP Rating:

IP68 and IP6K9K

Product Specification:

108-160170

Application Specifications:

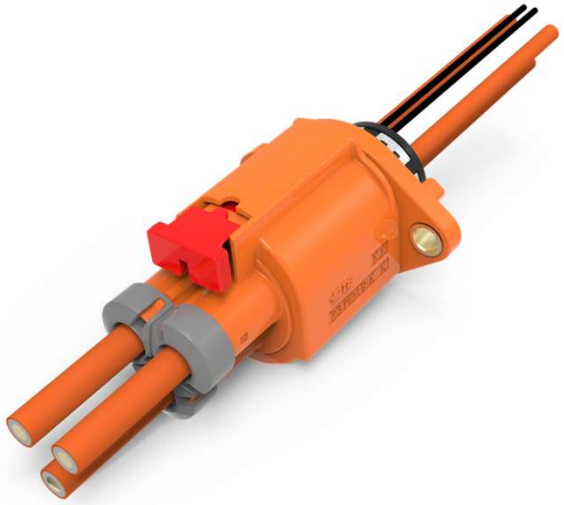
114-160093/114-160095

Spec Following:

LV214 and LV215

EMC:

LV215 PG50



HVA HD400 Multicore Plug

Description 描述	Picture 图片	Usage 用量		H&S Cable H&S 线缆				Coficab Cable Coficab 线缆
		2POS	3POS	PN for 2*2.5mm², 3*2.5 mm² 2*2.5mm², 3*2.5 mm²线零件号	PN for 2*4mm², 3*4 mm² 2*4mm², 3*4 mm²线零件号	PN for 2*6mm² 2*6mm²线零件号	PN for 3*6mm² 3*6mm²线零件号	PN for 2*6mm² 2*6mm²线零件号
4MM socket contact		2	3	*-2349177-1	*-2349177-2	*-2349177-3		
Outer housing assy		1	1	2392519-1				
Inner ferrule		1	1	2392553-1	2392553-2	2392553-3	2392553-4	
Outer ferrule		1	1	2392554-1	2392554-2		2392554-3	
SWS		1	1	2392556-1	2392556-2	2392556-3	2392556-4	
Cable clip		1	1	2392558-1	2392558-2	2392558-3	2392558-4	
Rear cover		1	1	2392559-1	2392559-2	2392559-3	2392559-4	
Spacer		1	1	2392560-1	2392560-2		2392560-3	
Inner housing		1	1	*-2392563-* (Definite PN see cuetomer drawing)				
Fixture		1	1	2392564-1				
TPA assy		1	1	2392567-1				

Cavity:

2 or 3

Fire Classification:

UL94-V0

IP Rating:

IP68 and IP6K9K

Product Specification:

108-160170

Application Specifications:

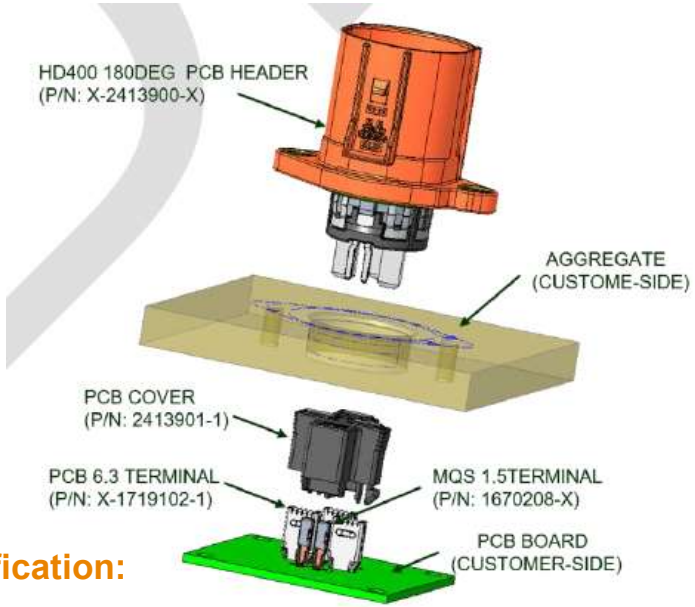
114-160337

Spec Following:

LV214 and LV215

HVA HD400 Header Bladed connections

Description 描述	Picture 图片	Usage 用量		Part Number 零件号
		2POS	3POS	
HVA-HD400 3POS HEADER ASSY, 180DEG		/	1	2413900 -* 1-2413900 -*
HVA-HD400 2POS HEADER ASSY, 180DEG		1	/	2-2413900 -* 3-2413900 -*
HD400 180DEG HEADER PCB COVER		1	1	2413901-1
PCB 6.3 TERMINAL		2	3	*-1719102-1
MQS 1.5 TERMINAL		2	2	1670208-*



Cavity:

2 or 3

Fire Classification:

UL94-V0

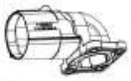
Application Specifications:

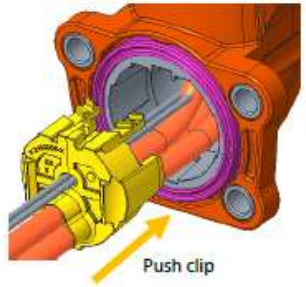
114- 160465

Spec Following:

LV214 and LV215

HVA HD400 90º Header

Description 描述	Picture 图片	Usage 用量 2POS	Usage 用量 3POS	PN for 2.5mm² 2.5mm²线零件号	PN for 4mm² 4mm²线零件号	PN for 6mm² 6mm²线零件号
Outer housing assy		1	1	2416068-* (Definite PN see customer drawing)		
Inner housing assy		1	1	*-2416070-* (Definite PN see customer drawing)		
Wire fixture		1	1	2416073-1	2416073-2	2416073-3
Clip			1	2413806-1	2413806-2	2413806-3
		1		1-2413806-1	1-2413806-2	1-2413806-3
MCON1.2 terminal		2	2	5-1418758-3		
4MM PIN contact		2	3	*-2349180-1	*-2349180-2	*-2349180-3



Cavity:

2 or 3

Fire Classification:

UL94-V0

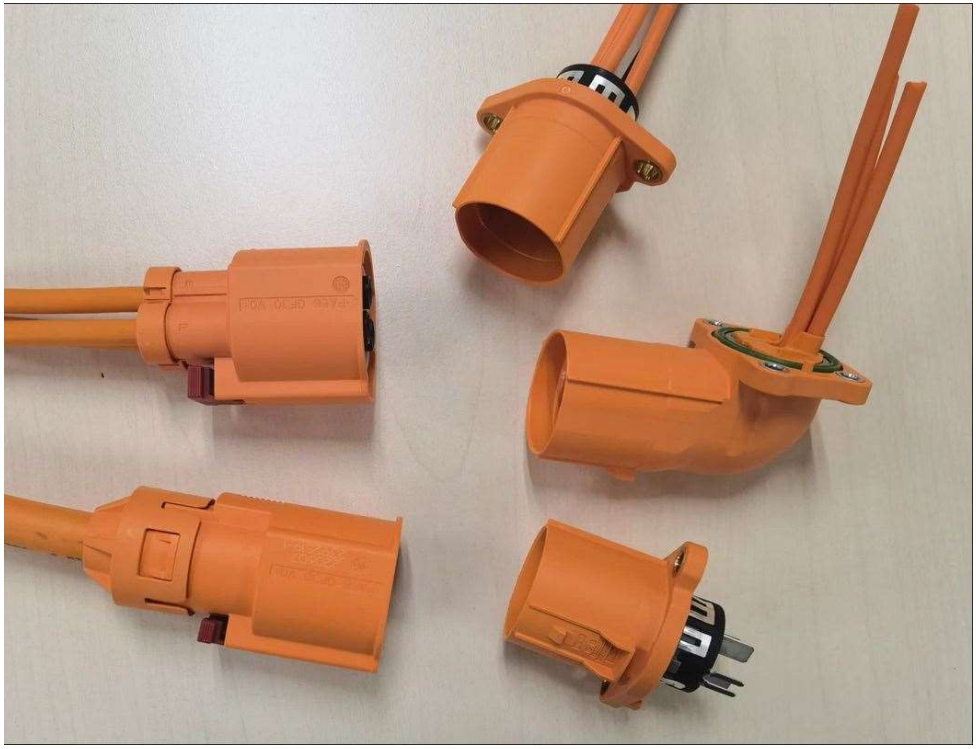
Application Specifications:

114-160443

Spec Following:

LV214 and LV215

HVA HD400 connector’s family

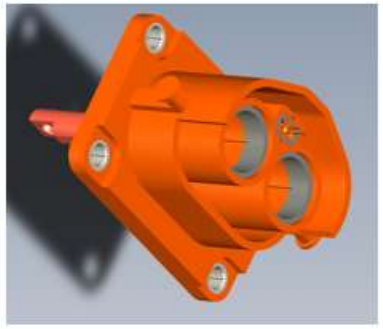


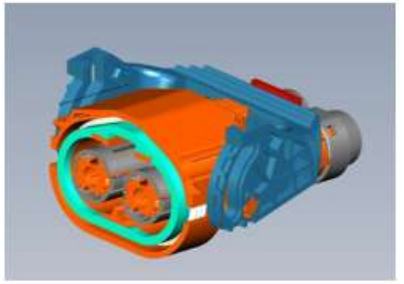
TE Connectivity HVA HD600 – 2P & 4P

TE New HV Accessory Connector – Design for Heavy Duty

Value Proposition :

- **High Performance:**
  - **Electrical**
    - ✓ **125A**@80℃
    - ✓ **10/16/25**mm²
    - ✓ **1000**VDC
  - **Environment**
    - ✓ **-40℃ ~ 140℃**
    - ✓ **IP68 IP6K9K**
    - ✓ **ISO 16750-3 test 7/9**
    - ✓ **UL94-V0**
- **New Design:**
  - ✓ High vibration, high EMC performance, High water tightness, high current ampacity
  - ✓ 2/3/4 position to meet most class 3 application





- **Location : CHN**
- **Milestone : Design**
- **B sample: 2023.1**
- **Product spec : TBD**
- **Application spec : TBD**

Product Overview: MCON12 LV connector system

There is need for a low voltage power connector in the portfolio with high wire size up to 35mm².

Position
2Pos.

Code
180deg A & B and 90deg C & D

Contact / Terminal System
MCON 12 – Welded (x2)

Operating Temperature
-40°C to +120°C

Degree of protection (Immersion)
IP69K (with seal cover)

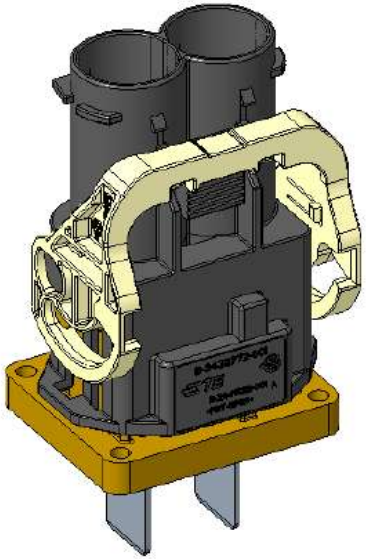
Voltage & Current
60V & 179Amp @ 80°C for 35mm^2 wire

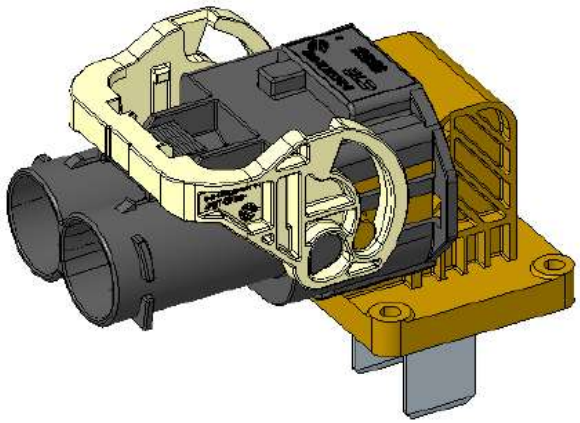
Flamability
Flame retardant UL 94 V-0 material

Vibration Level

Chassis


Wire-to-Board


180° Header assembly


90° Header assembly