

NEW

Amphenol

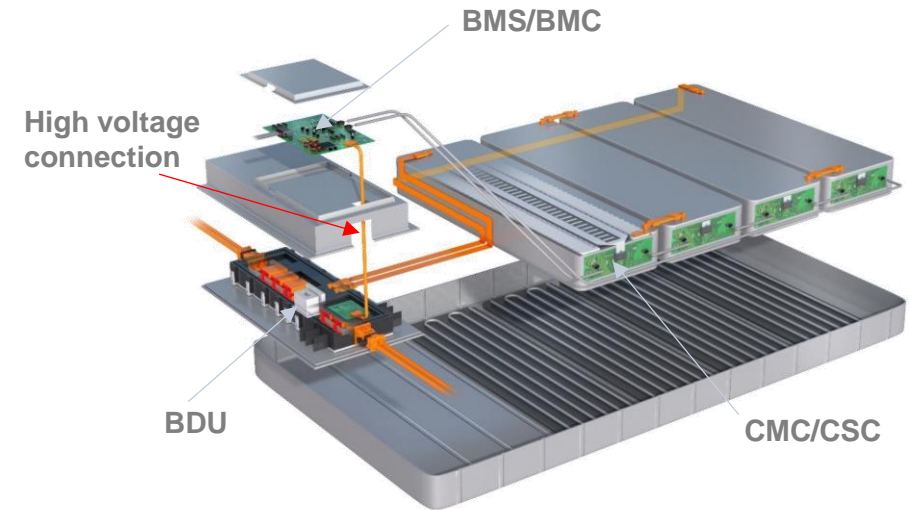
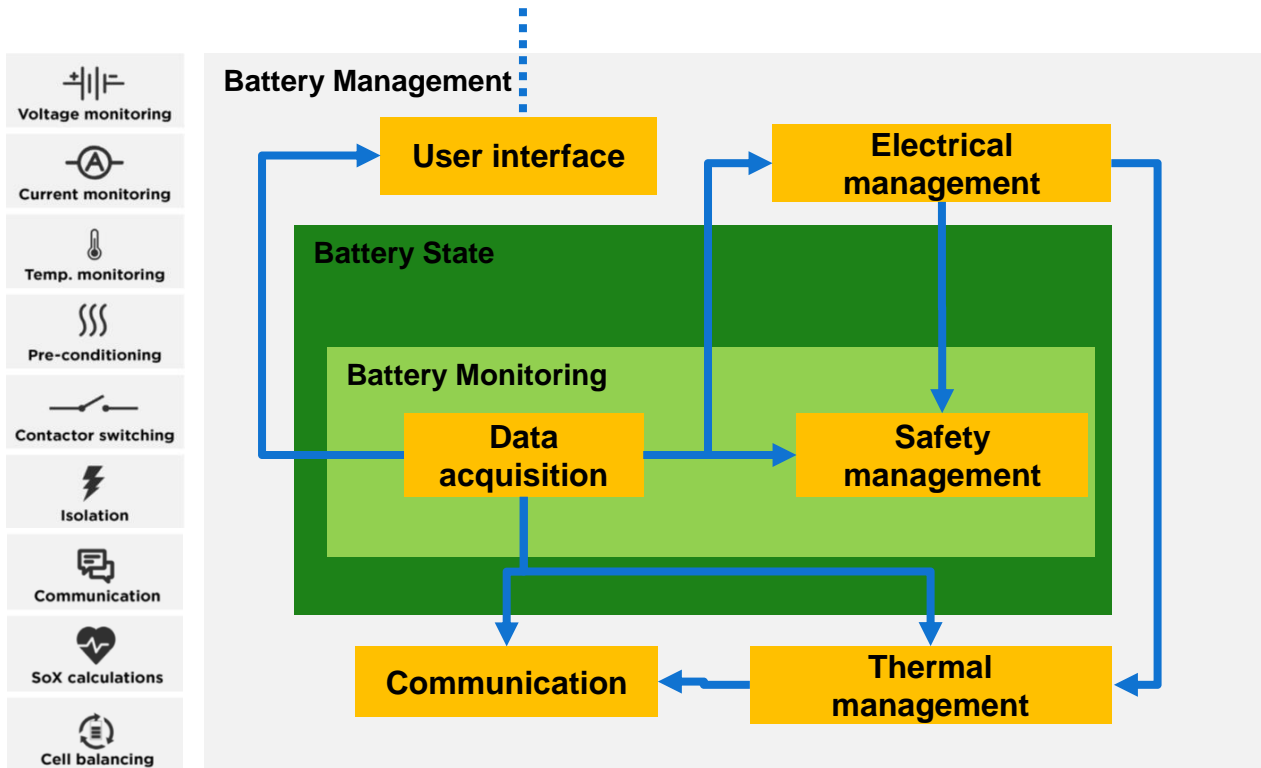
COMMUNICATIONS SOLUTIONS

HVLock® product presentation

 **FCi Basics**

Key application focus for e-mobility

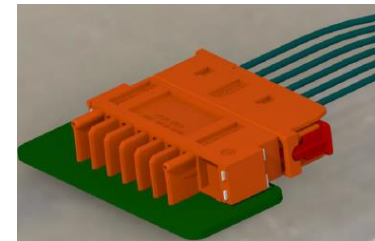
Battery Management System – Description



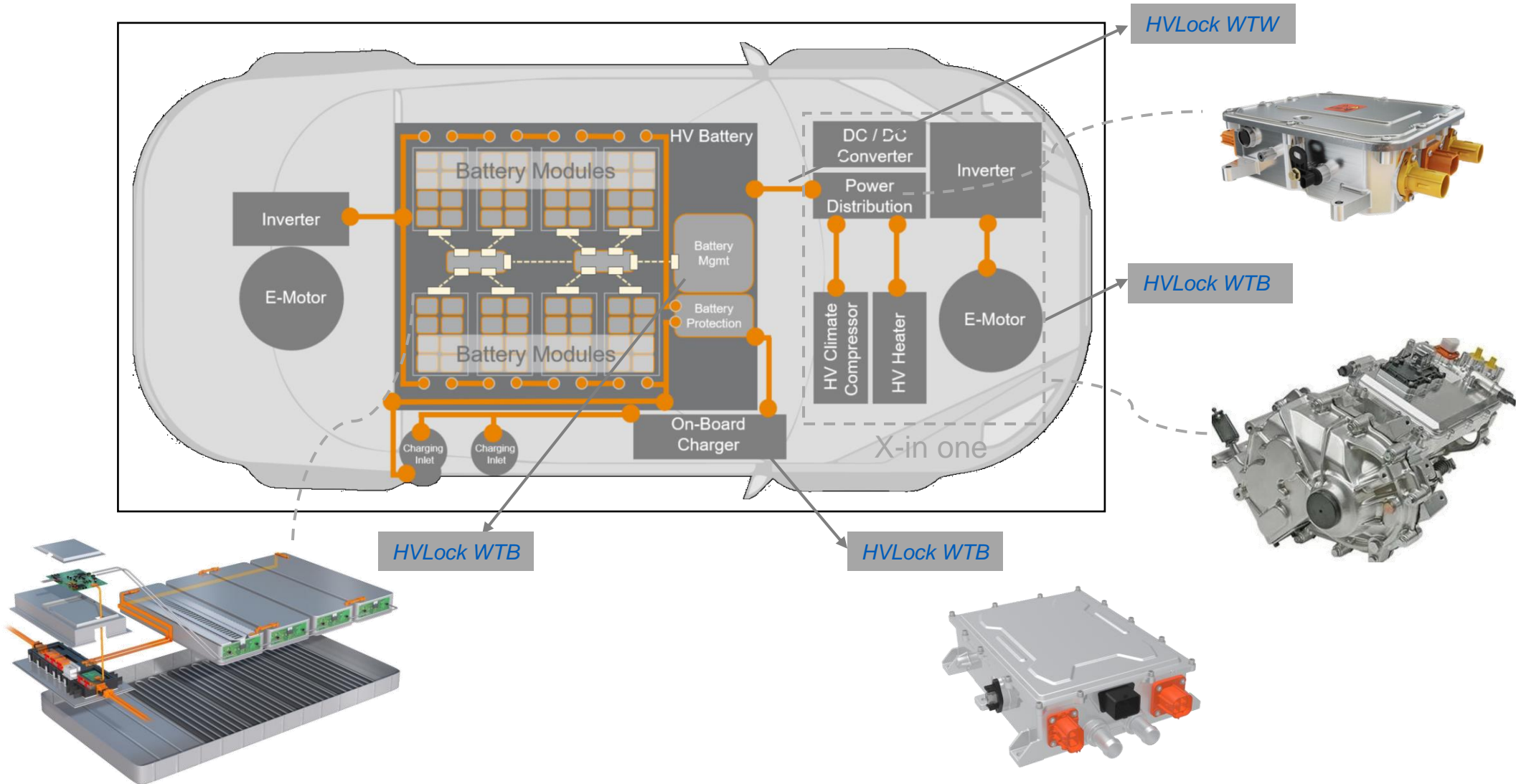
- ✓ The BMS is critical for optimum battery performance and safety. It must operate with a high degree of accuracy and reliability. However, it also needs to be compact and lightweight, adding the least possible bulk to the battery pack.
- ✓ It protects the battery from operating outside its safety limits by monitoring temperature and voltage signals from the cell modules as well as pack-level current signals and transmitting them to the elements that balance or control the module environment.

- ✓ For high-voltage area is responsible for the voltage and total voltage detection of single battery, insulation detection, relay adhesion detection, high-voltage interlocking, high-voltage power-on pre-charging, etc.
- ✓ The HVLock connector is a specific design which will optimize the performance and the size to fit BMS manufacturers needs.

- The HVLock® Wire-To-Board connector's addresses the growing demand for automotive-grade connectors especially BMS manufacturers needs.
- This connector system is available in a **single row with active latch, coding, CPA** and **PLR** features.
- The connector capable of supporting working voltage 1200V with current carrying capacity of **3A** (all contacts powered) and wire gauge from **22AWG to 20AWG**.
- HVLock® is available in **3 up to 10 positions** with right angle and horizontal configurations in THT and SMT types.
- HVLock® is compliant to automotive grade certifications **USCAR-2 T2V2** and **LV-214 S2**(in process).



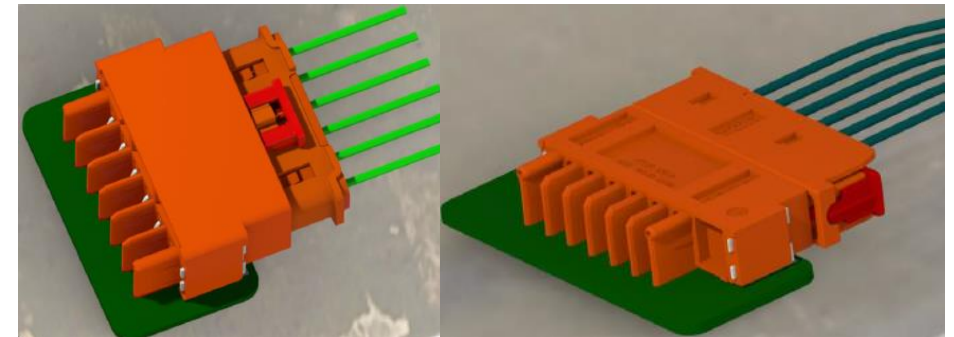
HVLock® Target Market Application in EV



HVLock® Family Configuration Matrix

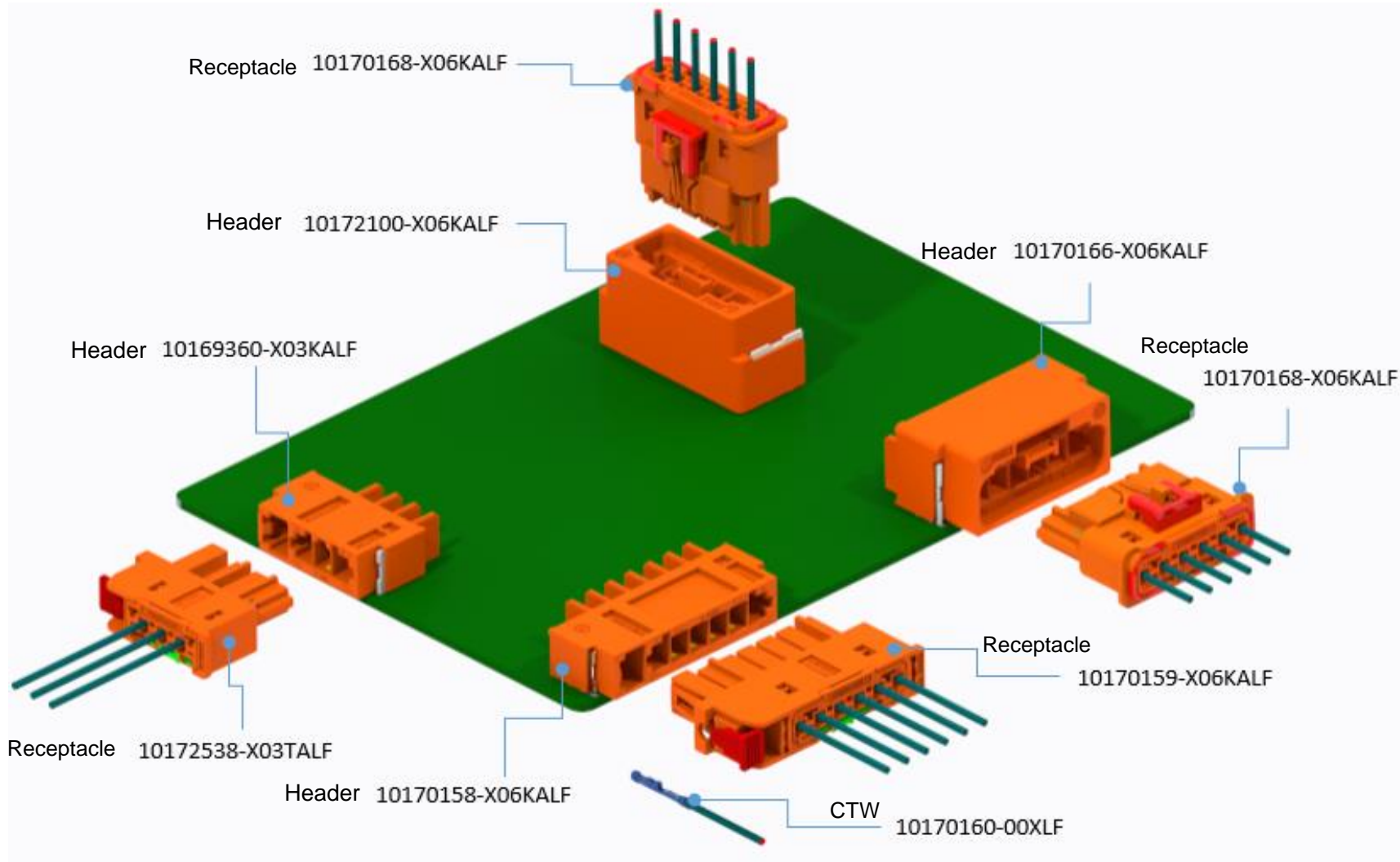
Board pitch	Description	Wire to Board			Max Current (A)	Wire size AWG	Plating options	Latch	CPA	PLR
		Base number	Pin position	Single Row						
4.50 mm	Top Latch Right Angle Header THT	10170166	6-10pin	v	3A	20/22AWG	Tin, Gold, Ag	v	v	v
	Top Latch Right Angle Header SMT	10167898	6-10pin	v	3A	20/22AWG	Tin, Gold, Ag	v	v	v
	Top Latch Receptacle	10170168	6-10pin	v	3A	20/22AWG	Tin, Gold, Ag	v	v	v
	Side Latch Right Angle Header THT	10169360	6-10pin	v	3A	20/22AWG	Tin, Gold, Ag	v	v	v
	Side Latch Right Angle Header SMT	10170158	6-10pin	v	3A	20/22AWG	Tin, Gold, Ag	v	v	v
	Side Latch Receptacle	10170159	6-10pin	v	3A	20/22AWG	Tin, Gold, Ag	v	v	v
	Receptalce terminal	10170160	6-10pin	v	3A	20/22AWG	Tin, Gold, Ag	v	v	v

- Latch position: Top and side
- Positions: 6-10Position (Custom for 3-5position)
- Tooled positions: 3, 6, 8positions for side latch. 6 & 10positions for top latch
- Header soldering: SMT and THT



*PLR: Primary Lock Reinforcement, ensures efficient terminal positioning and detection of partial installation of terminals

HVLock® product overview



General:

- Modular high voltage connector system
- 6-10Position (Custom for 3-5position)
- Pitch: 4.5mm
- Configuration: Right Angle& Vertical
- PCB thickness 1.60mm

Material:

- Housing: High temp. UL94V-0; Halogen Free
- Crimping terminal: Copper alloy(Tin, Gold, Ag plating options)
- Resin material: CTI>600

Electrical Performance:

- Clearance: Impulse voltage 4000V
- Low Level Contact Resistance:< 25mΩ
- Insulation Resistance: > 100MΩ
- Voltage Rating: 1200V
- Current Rating: 3Amax/ per pin
- Wire gauge: 0.50mm² (AWG20), 0.22-0.35mm²(AWG22)

Environmental:

- Working temperature: -40°C / +105°C for Tin
- Working temperature: -40°C / +125°C for Gold
- Material: UL94V-0
- Halogen Free

Mechanical Performance:

- Durability: 10 cycles (Tin plated), 30 cycles (Gold plated)
- Mating /Un-mating Force: <75N
- Terminal Retention into Housing: >50N

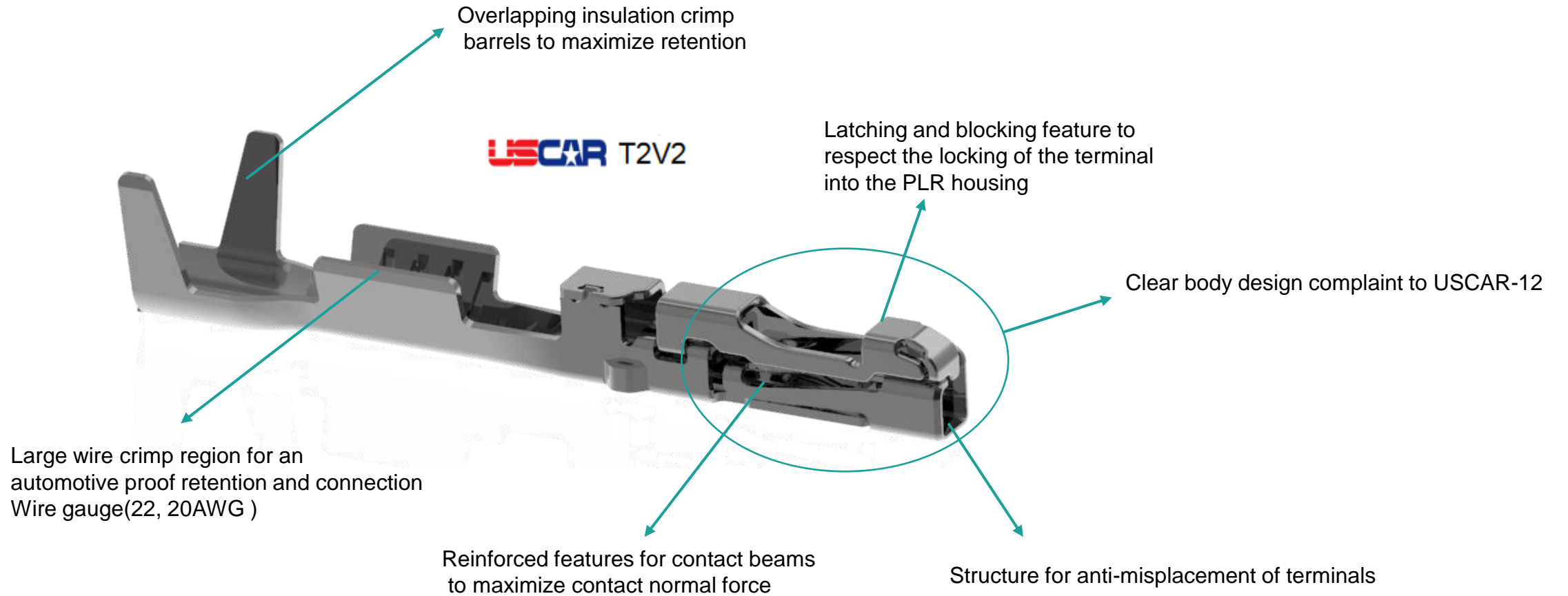
Approvals and Certifications:

- USCAR-2
- USCAR-37(HV testing parts)
- LV-214 S2(In process)

Specifications:

- Product Specification: GS-12-1831
- Application Specification: GS-20-0802
- Hand tool P/N: 10172953-001HT

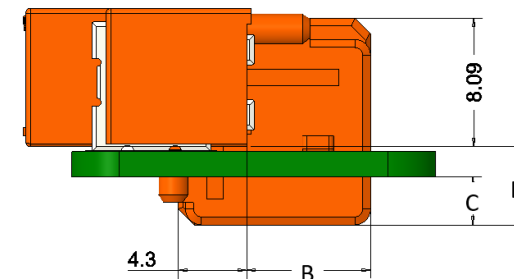
Female terminal features



Custom wing length to meet Creepage distance

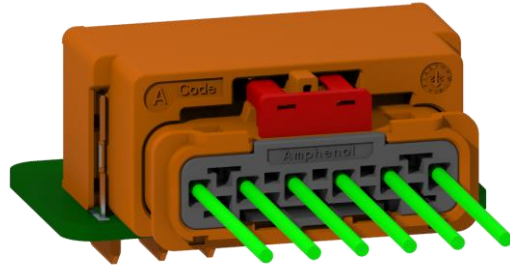
Length of wings according to creepage study

	TYPE	Length of wings / mm			Creepage distance / mm				PD2, CTI 1
		B	C=D-1.9	D	E	F (Related to DIM B)	G	H (Related to DIM C)	Requirement
Side latch	SMT	6.7	0.7	2.6	7.5	8.1	11.8	7.6	Meet 1200V
	THT	6.7	2.5	4.4	7.5	13.2	9.7	7.6	Meet 1200V
Top latch	SMT	6.7	0.7	2.6	7.5	7.5	12.8	7.6	Meet 1200V
	THT	6.7	2.5	4.4	7.5	13.2	9.7	7.6	Meet 1200V

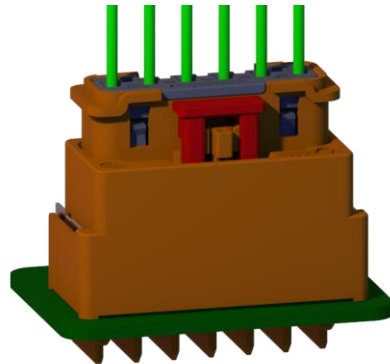


Product offering_ Top latch

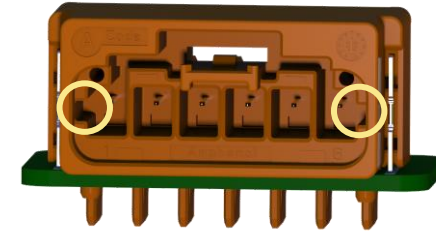
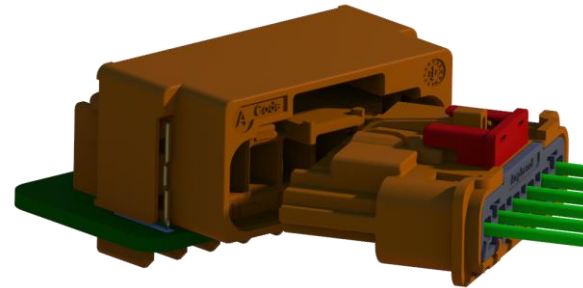
USCAR T2V2



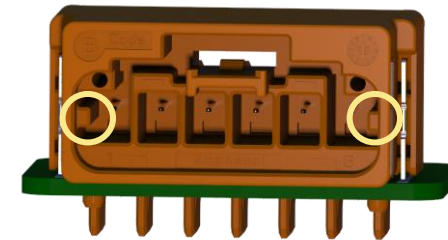
Right Angle



Vertical

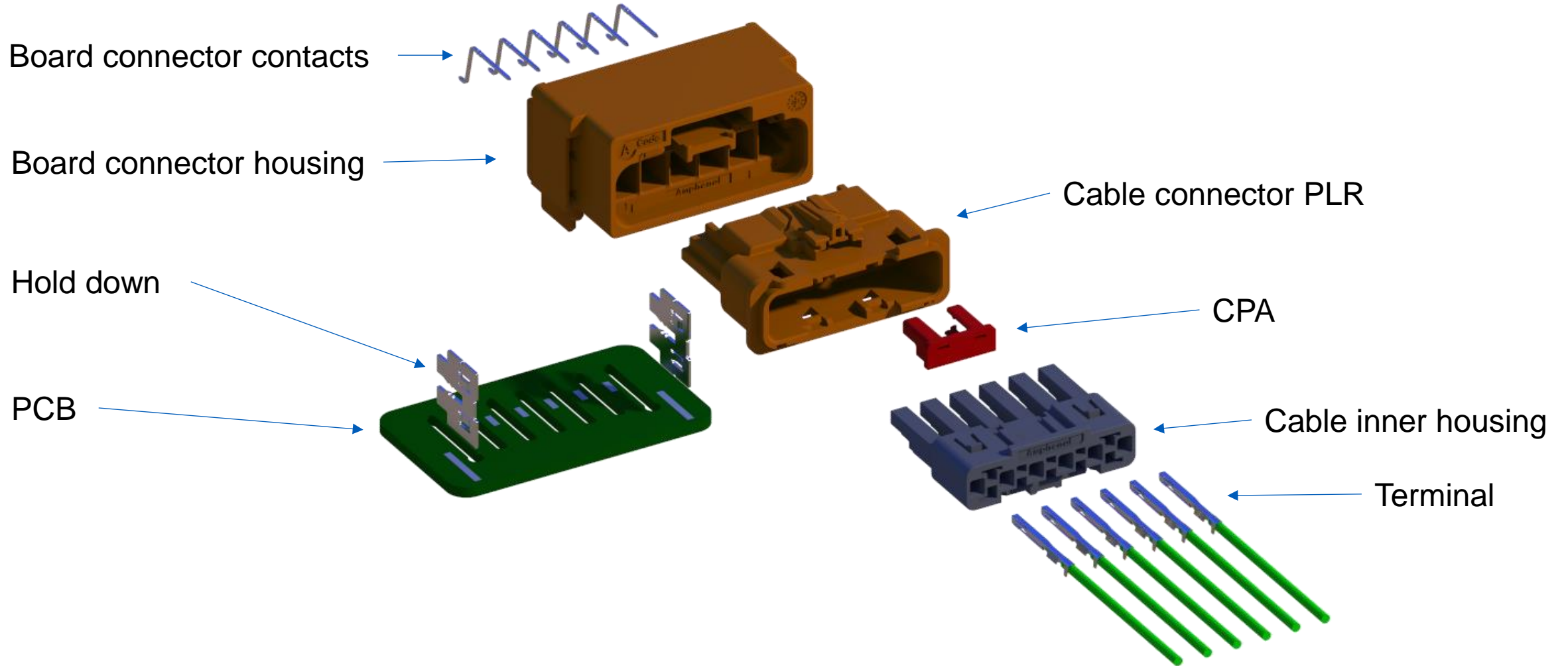


A code



B code

Exploded view top latch

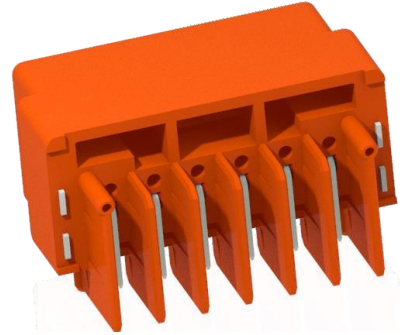


Configuration_Top Latch Header



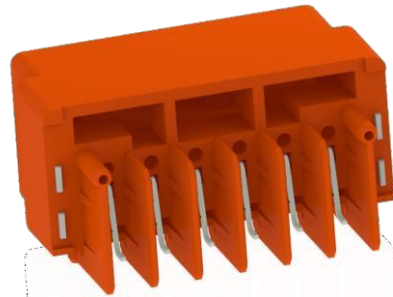
Top Latch Board Conn.

THT Type



Base Number: 10170166

SMT Type



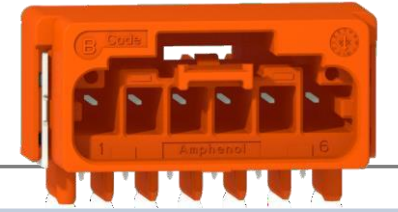
Base Number: 10167898

A Code



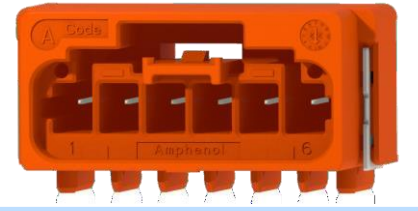
P/N:10170166-X06KALF

B Code



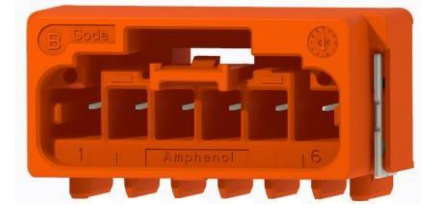
P/N:10170166-X06KBLF

A Code



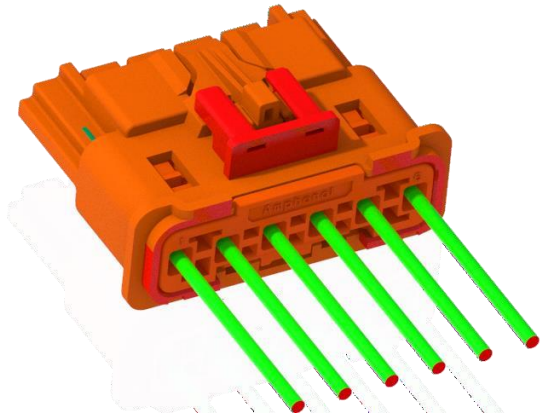
P/N:10167898-X06KALF

B Code

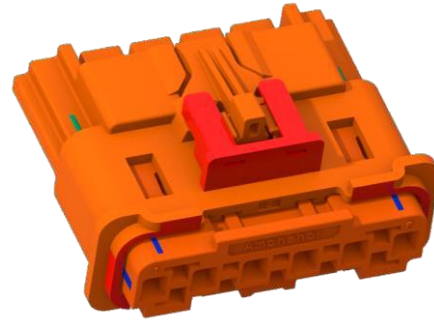


P/N:10167898-X06KBLF

Configuration_Top Latch Receptacle



Top Latch
Cable Kits Conn.



Base Number: 10170168

A Code



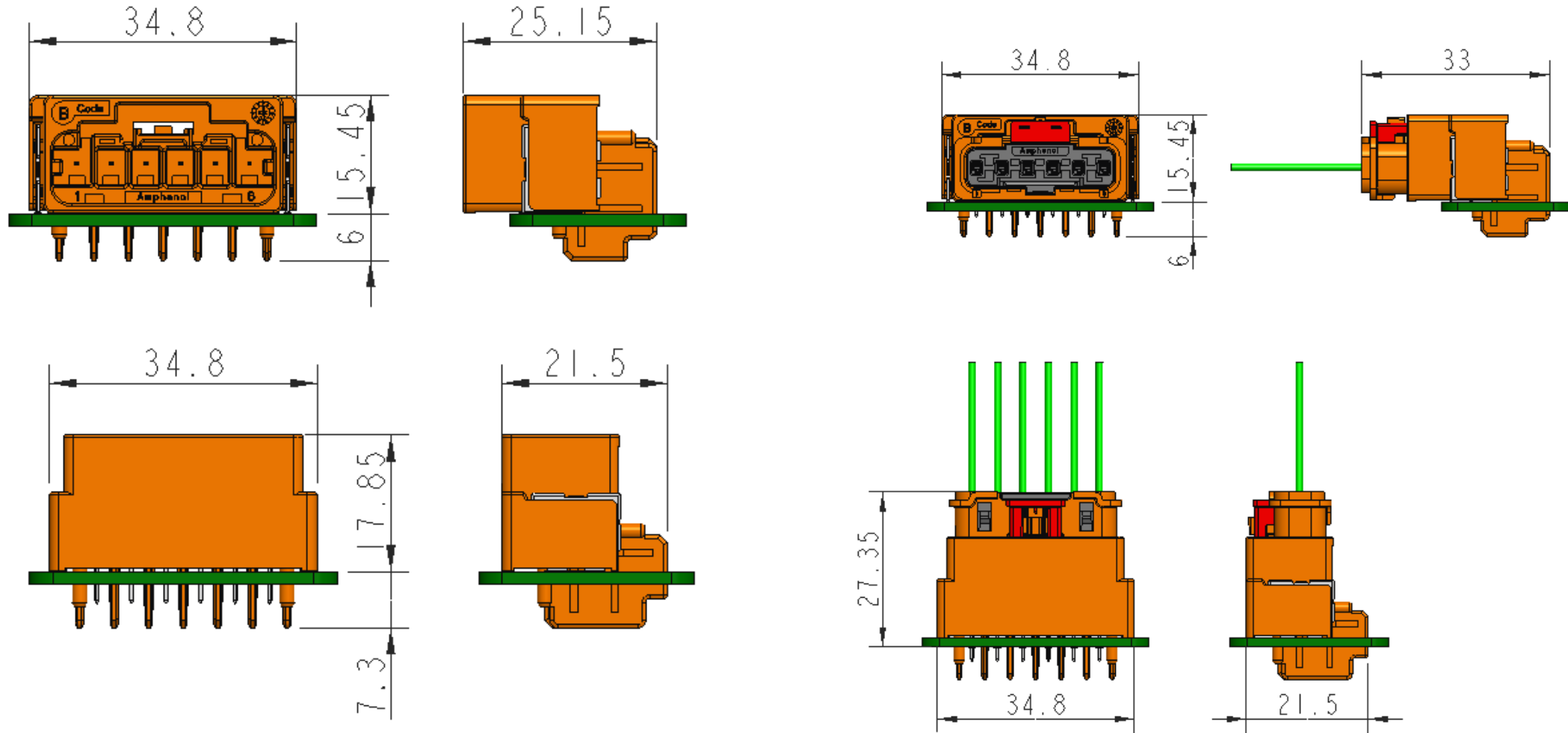
P/N:10170168-106K^ALF

B Code



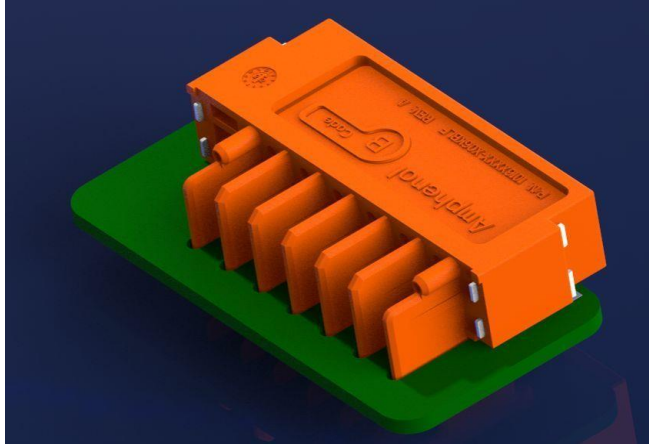
P/N:10170168-106K^BLF

Dimensions

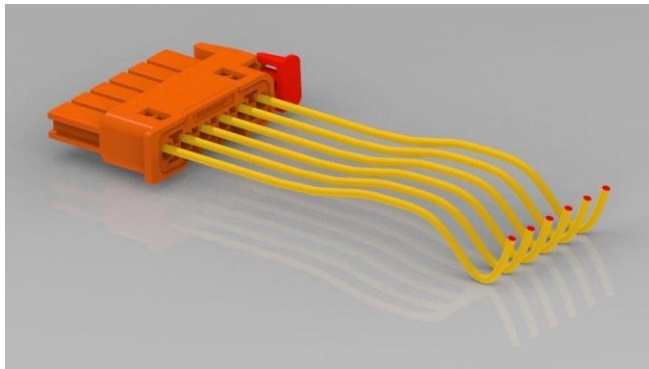
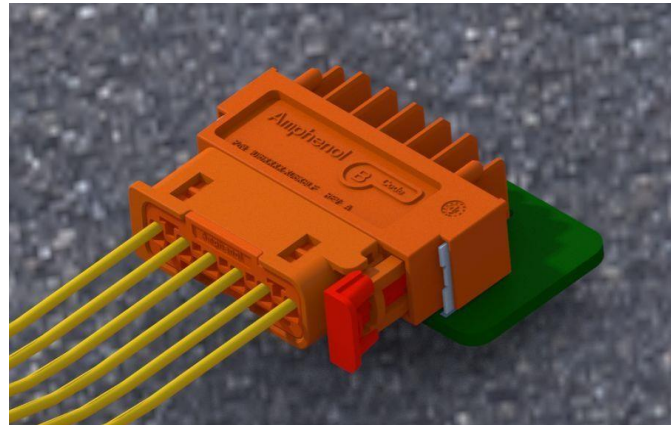


Product offering_ Side latch

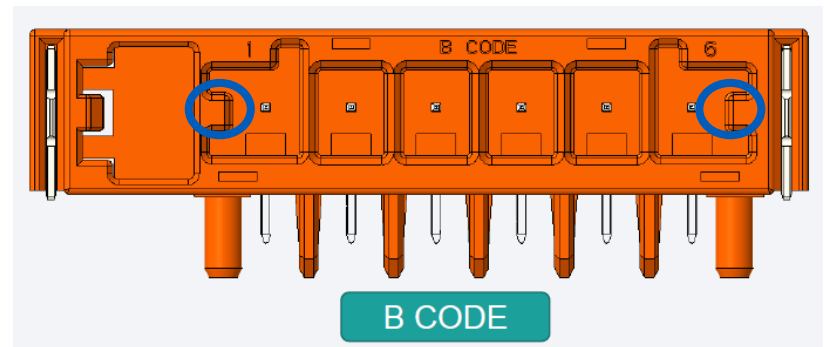
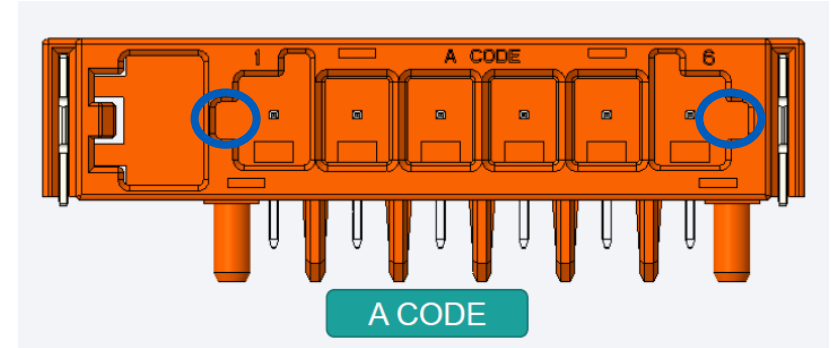
USCAR T2V2



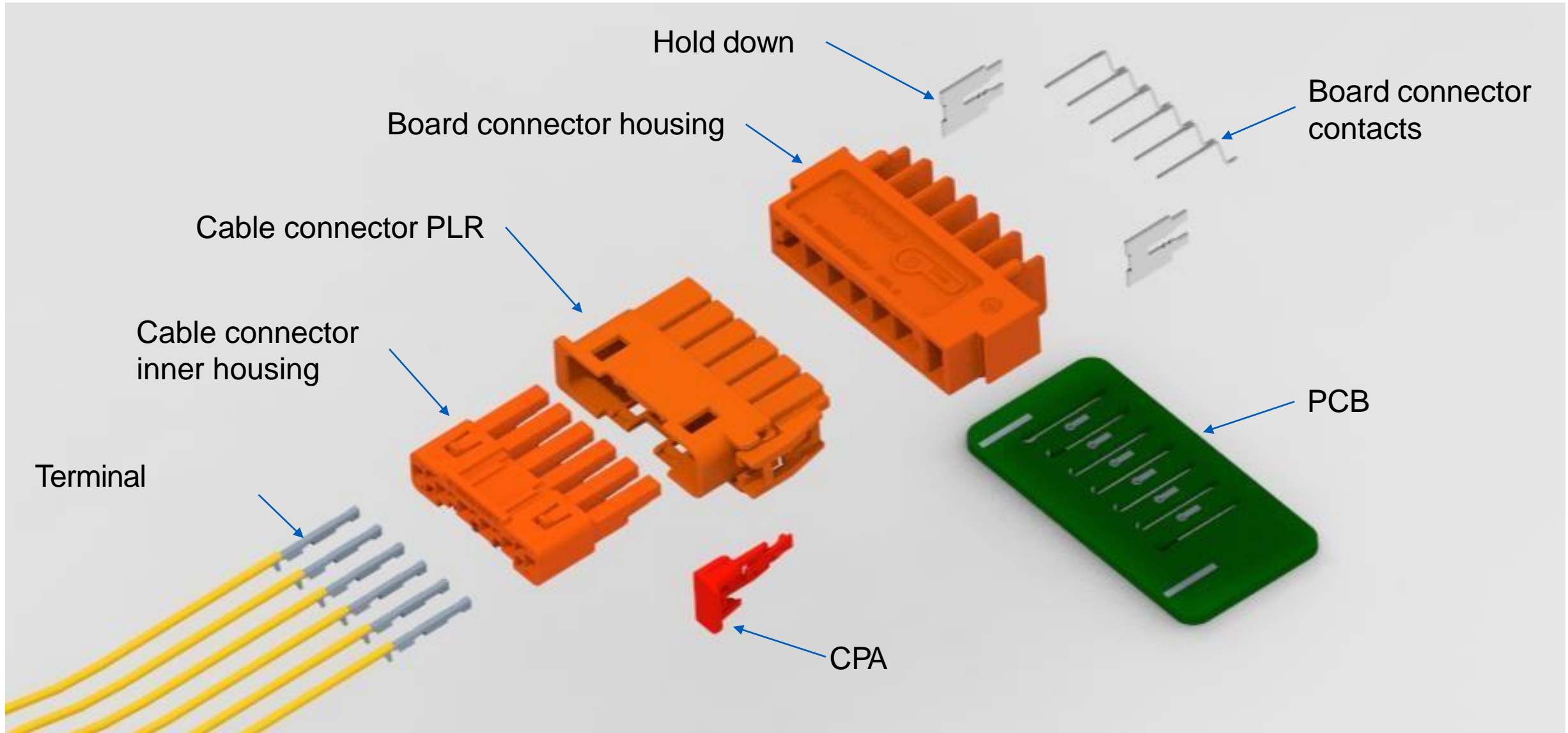
Side latch header



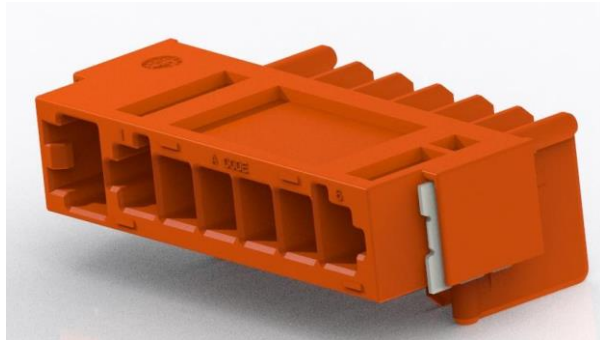
Side latch receptacle



Exploded view side latch



Configuration_ Side Latch Header



Side Latch Board Conn.

THT Type



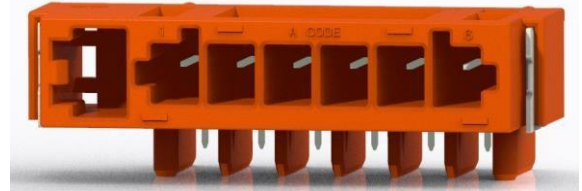
Base Number: 10169360

SMT Type



Base Number: 10170158

A Code



P/N:10169360-X06KALF

B Code



P/N:10169360-X06KBLF

A Code



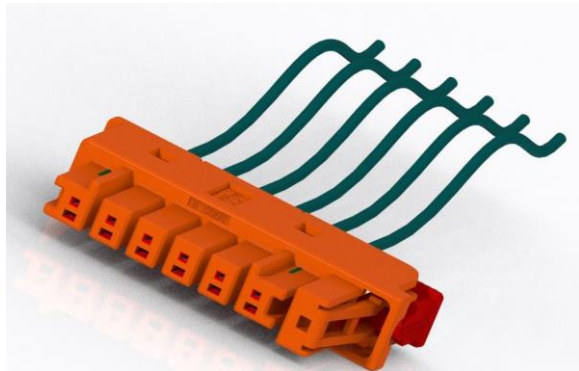
P/N:10170158-X06KALF

B Code



P/N:10170158-X06KBLF

Configuration_ Side Latch Receptacle



Side Latch
Cable Kits Conn.



Base Number: 10170159

A Code

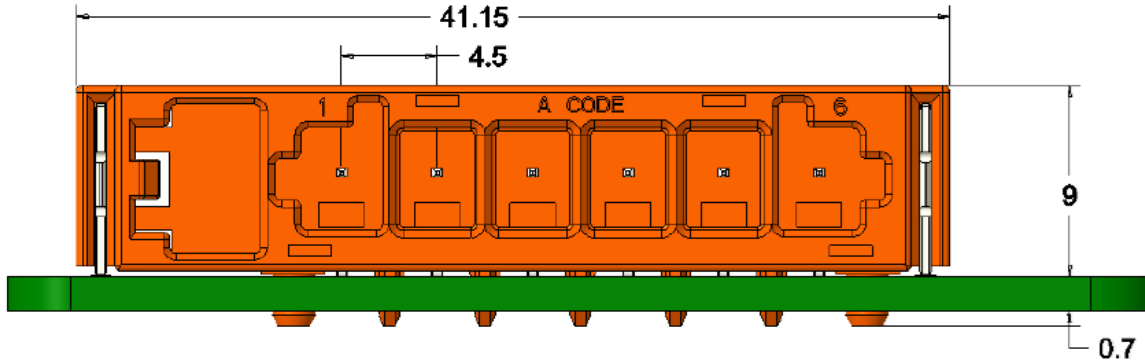


P/N:10170159-106KALF

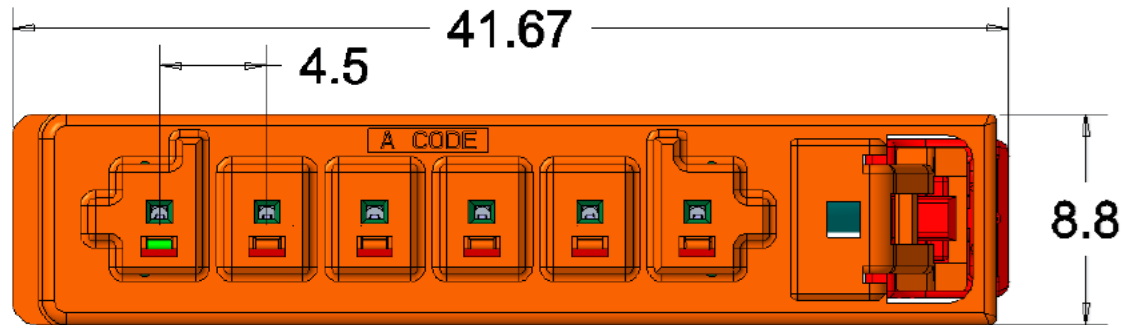
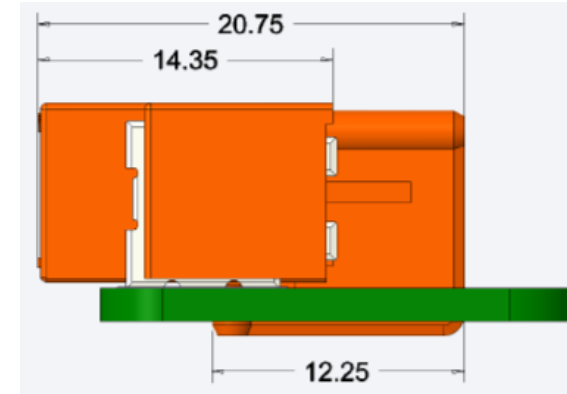
B Code



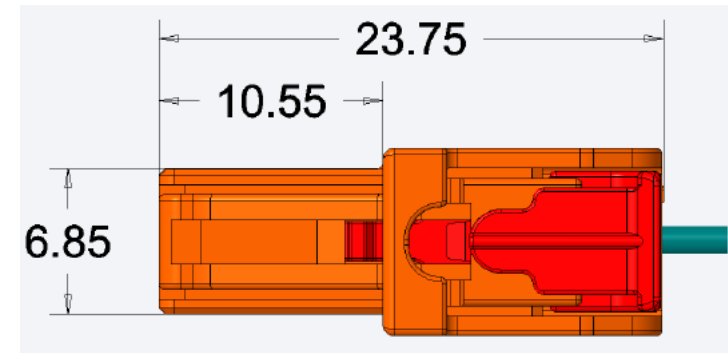
P/N:10170159-106KBLF



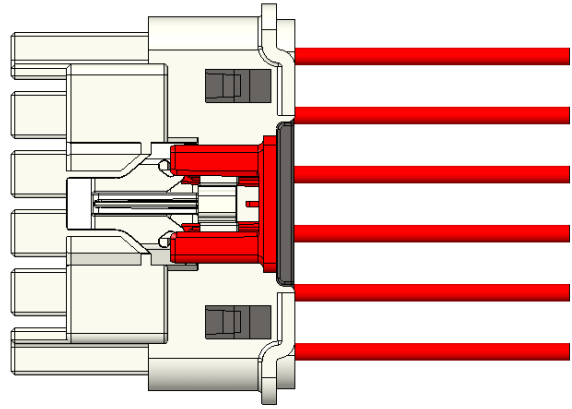
PCB Board side



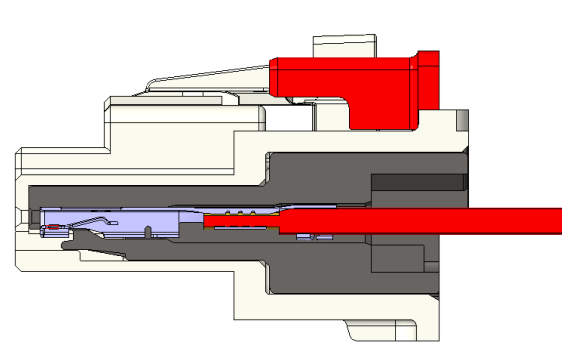
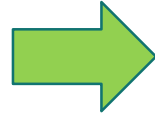
Cable housing side



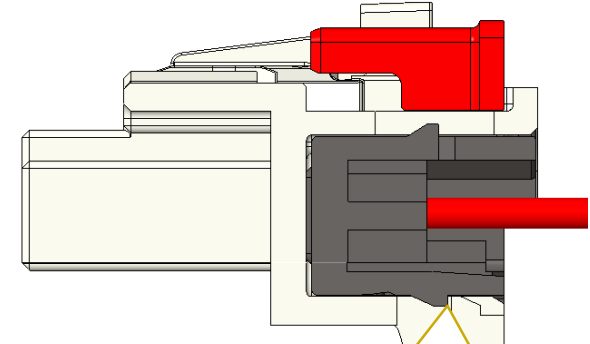
HVLock® – Repair procedure



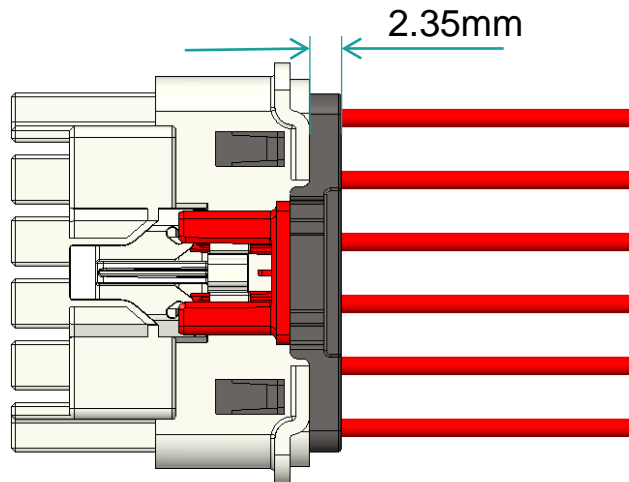
Secondary lock status



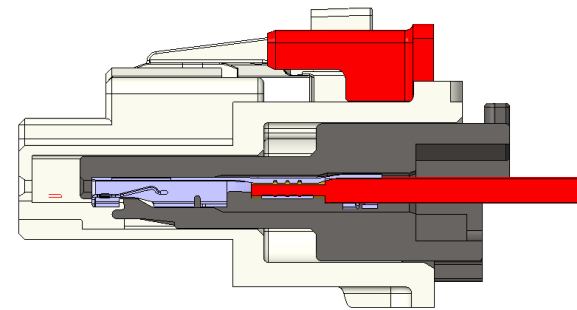
Secondary lock cross section



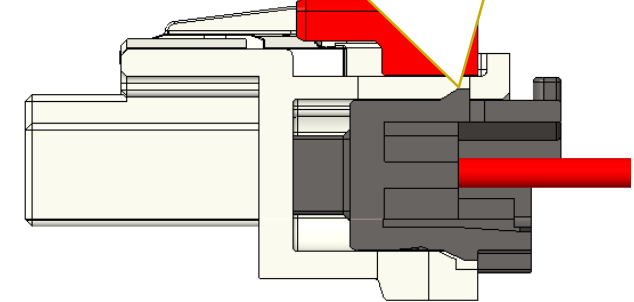
Detail repair procedure to see next page, introducing how to change the secondary lock status to primary lock status.



Primary lock status

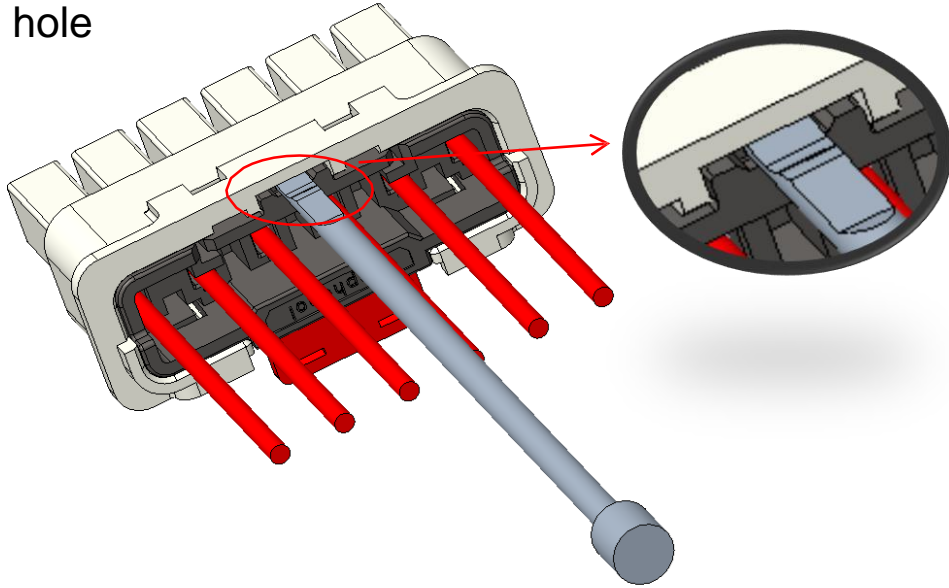


Primary lock cross section

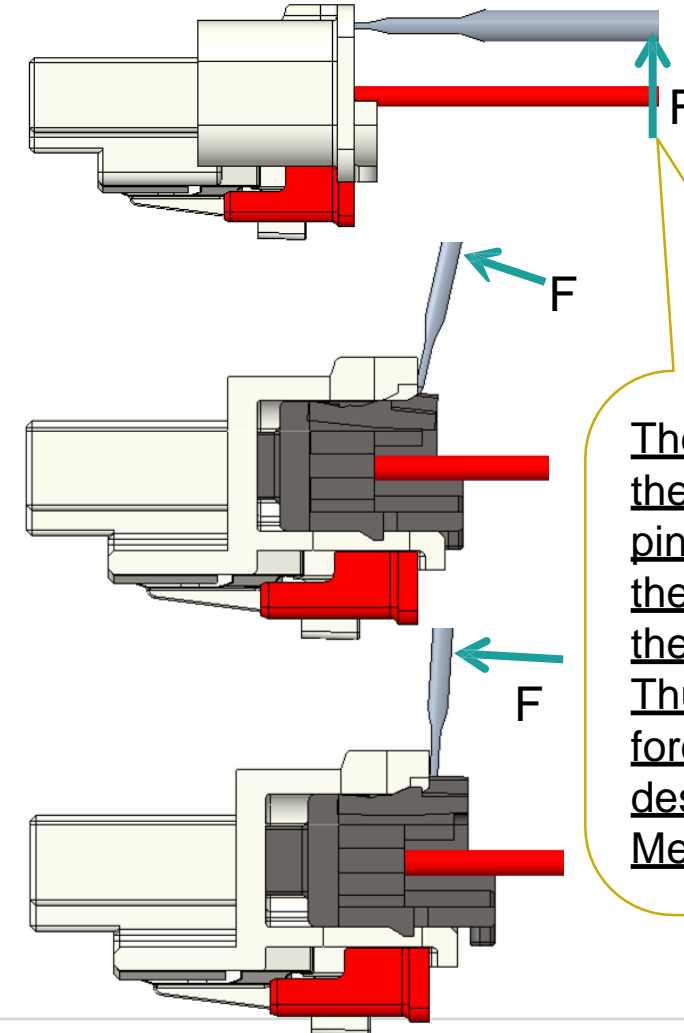


HVLock® – Repair procedure

① Insert metal crowbar pin into the middle gap hole

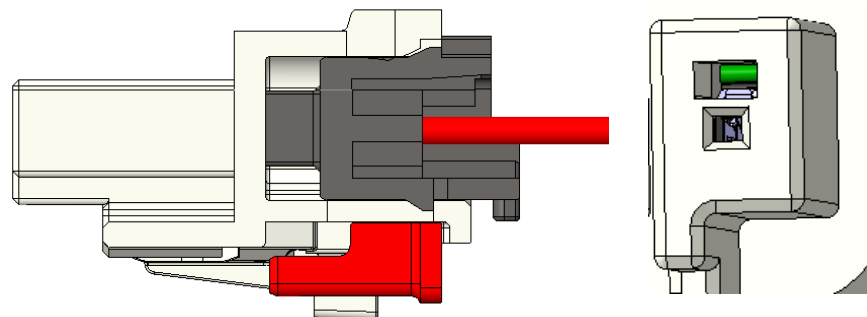


② Apply a normal force to the crowbar pin as below figure to convert the force to apply on the secondary lock latch



The force depends on the length of crowbar pin as it's like a lever, the longer the length, the smaller the force. Thus, the TPA opening force could be designed: $F_o < 50N$. Meet USCAR spec.

③ At primary lock location, following repairing steps same as MicrospaceXS products.



Crimping Tool:

- *Crimping zone partnership design*
- *VW60330 compliance terminal crimping*
- *List of compatible tools can be found in the application spec GS-20-0802*



Hand tool P/N: 10172953-001HT



BMS (Battery Management System)
OBC (On Board Charge)
MCU (Micro Control Unit)

Thank You