

# AIPC Automotive Power Solutions

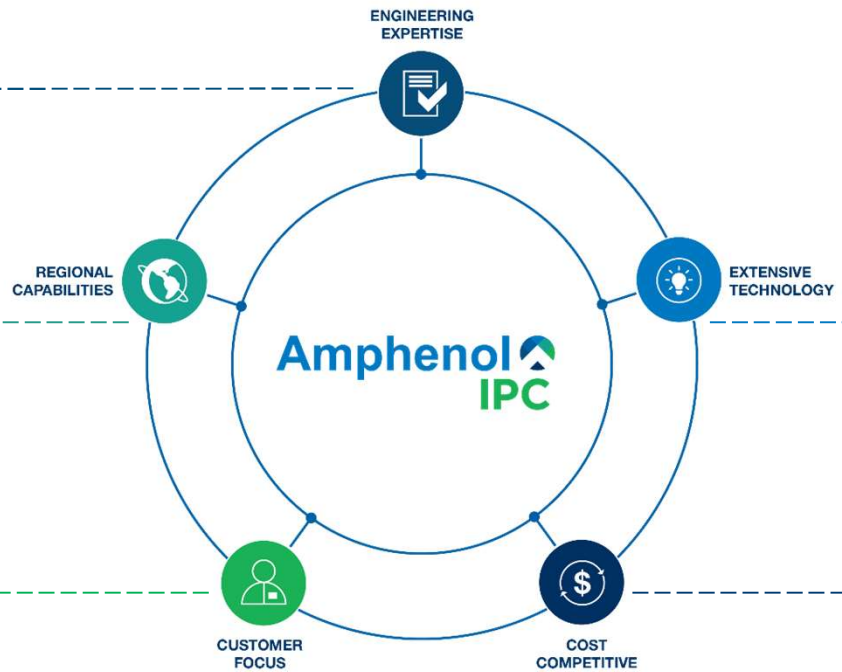
Amphenol   
IPC

# Amphenol IPC Capabilities

- ▶ 3D modeling
- ▶ Multiphysics simulation capabilities
- ▶ Field application engineering
- ▶ Design for manufacturability

- ▶ Endicott, New York\*
- ▶ Nogales, Mexico
- ▶ Lille, France
- ▶ Bangalore, India
- ▶ Nantong, China
- ▶ Shanghai, China
- ▶ Guangzhou, China

- ▶ Regionalized customer service departments



- ▶ Busbars: Power Distribution and Power Conversion
- ▶ Power Cable Assemblies: PowerLugs, Welded Lugs, Connectorized Cables
- ▶ Power Connectors
- ▶ Harness Assemblies
- ▶ Cable Assemblies

- ▶ Global materials management
- ▶ Manufacturing in low-cost regions

# Operational Footprint



- > Endicott, NY\*
- > Lille, France
- > Nogales, Mexico
- > Bangalore, India
- > Nantong, China
- > Shanghai, China
- > Guangzhou, China

All sites ISO9001:2015  
Nantong IATF 16949:2016

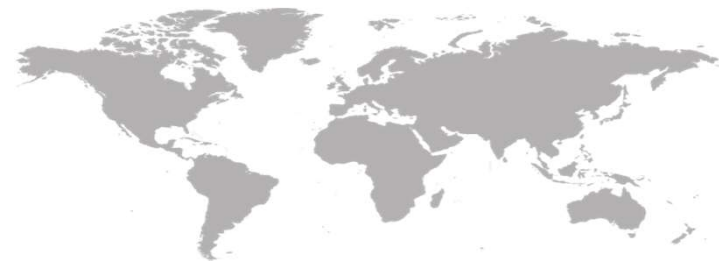


## Key business figures

**5** design centres and **6** manufacturing units  
(China, India, US and Europe)

**+200** current customer database

**+130** million dollars turnover



# Key Customers (industry & auto) Overview\_AIPC

- Railway
  - ALSTOM**
  - SIEMENS**
  - TOSHIBA**
  - BOMBARDIER TRANSPORTATION**
  - ABB**
  - vossloh KIEPE**
  - MITSUBISHI ELECTRIC**

- Motion control, panel boards and other industrial applications

- ABB**
- Linde**
- Schneider Electric**
- Rexroth Bosch Group**
- SIEMENS**
- legrand**
- FE**
- Nidec**
- Infineon**
- socomec Innovative Power Solutions**
- LEROY SOMER**
- hager**
- TMEIC**

EV/HEV

- TOYOTA**
- DANA**
- MITSUBISHI**
- JOHN DEERE**
- VOLVO**
- LUCID**
- MITSUBA**
- CAT**
- BorgWarner**
- NISSAN**

14.10.2019

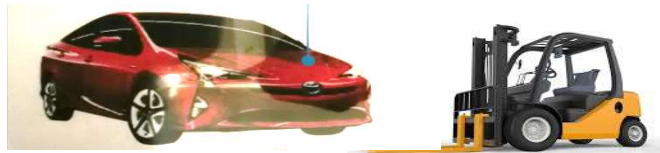
# AIPC Market Focus

## EV Charging



Busbars  
Power cables

## Electric car/Forklifts



Busbars  
Powerlug  
PDU

## Public Transportation



High V Cables  
Powerlug  
Flex Busbars



## Data Centers / Open Compute



OCP Busbar  
OCP Connector  
Busduct Connectors

## Battery / Critical Power



Powerlug  
Flexible Busbars

## Renewable Energy



Powerlug  
Power Cables  
Busbars

**Amphenol**  
**IPC**

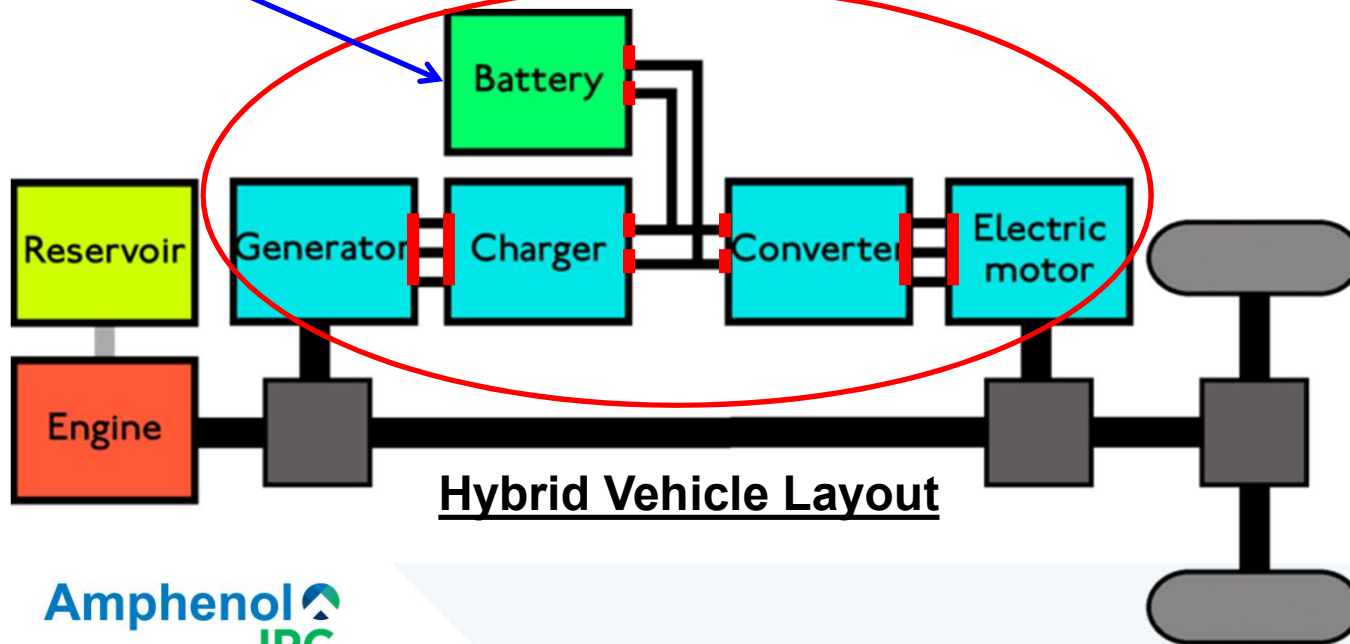
# Where Power Interconnects are utilized?

## Area for Power Interconnects

Battery: Many combinations of the interconnects are utilized within the battery pack to connect individual batteries together

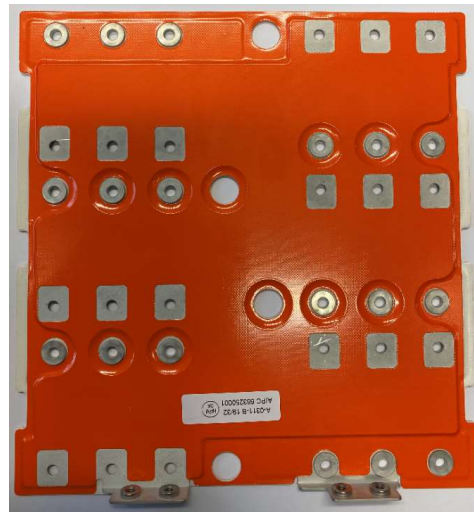
■ Connectors, Radsok, PowerLug

— Cable Assemblies & Busbars



# Power Distribution Busbars

## High Temperature Safety Orange Laminated Automotive Busbar



New material development for Automotive applications

Safety Orange

PET film

Acrylic flame-retardant adhesive

130 C rated



# Power Distribution Busbars

## Integrated Busbar Cooling

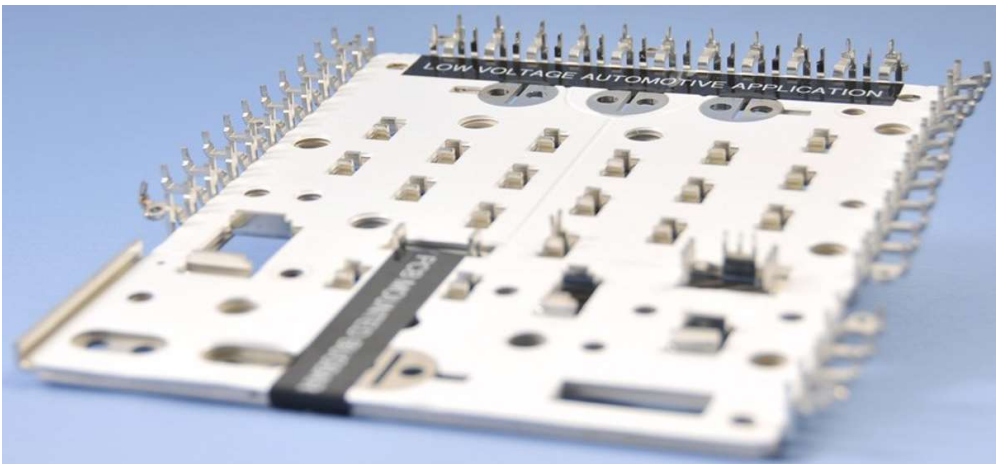


Integrated liquid cooling piped

Heat spreader plates

# Power Distribution Busbars

## Automotive Busbar Interconnects

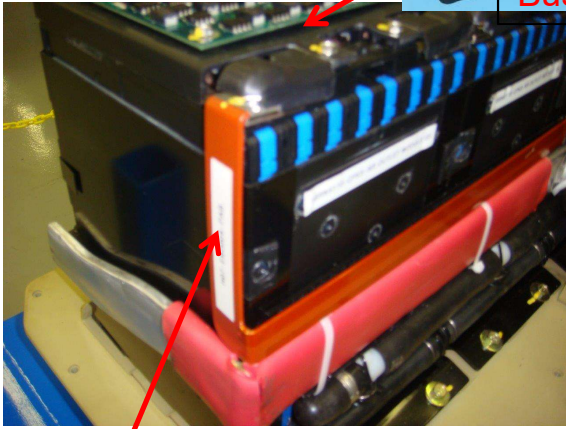
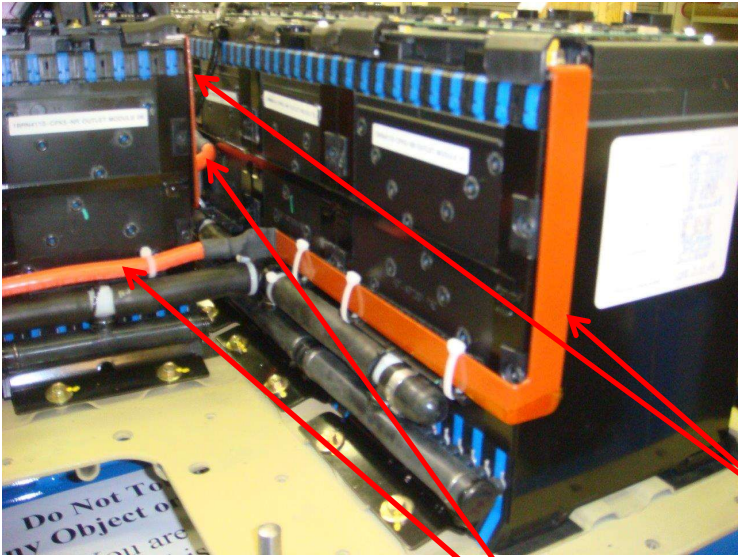


Integrated Faston connectors

Automotive fuse holders

# Examples for utilization of Power Interconnects

## Hybrid Vehicle Battery Packs



Cable Assemblies

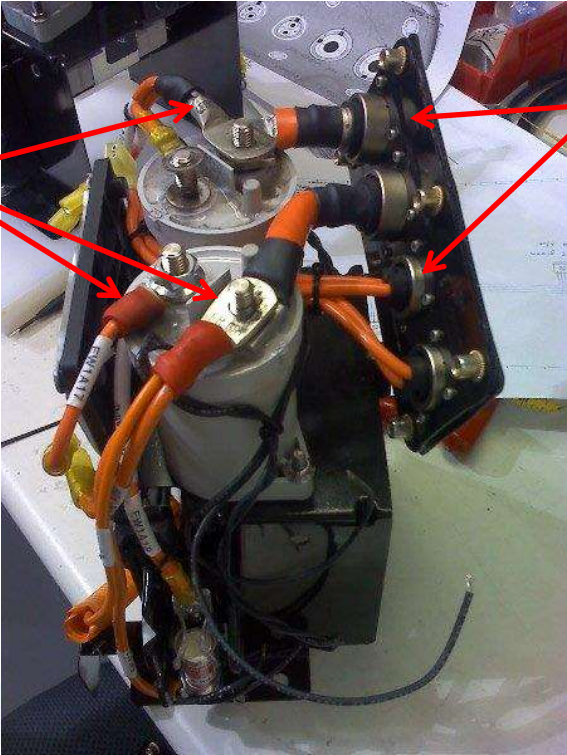
Busbars

Busbars + sensor

# Examples for utilization of Power Interconnects

## Hybrid Vehicle Convertor

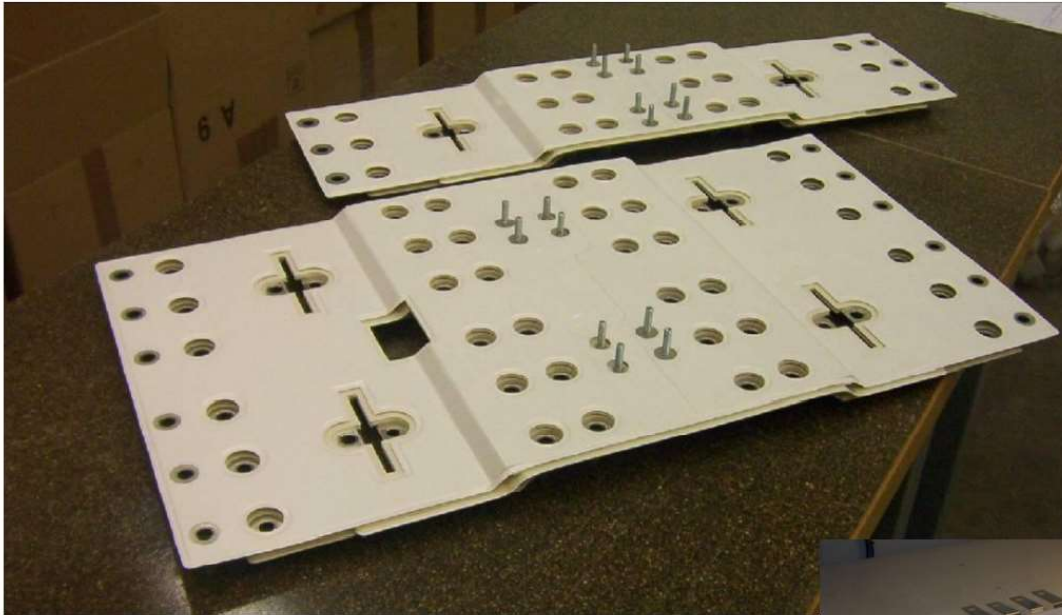
PowerLug  
Assemblies vs.  
crimp terminals



Connectors

# Example

- Application: Traction converters



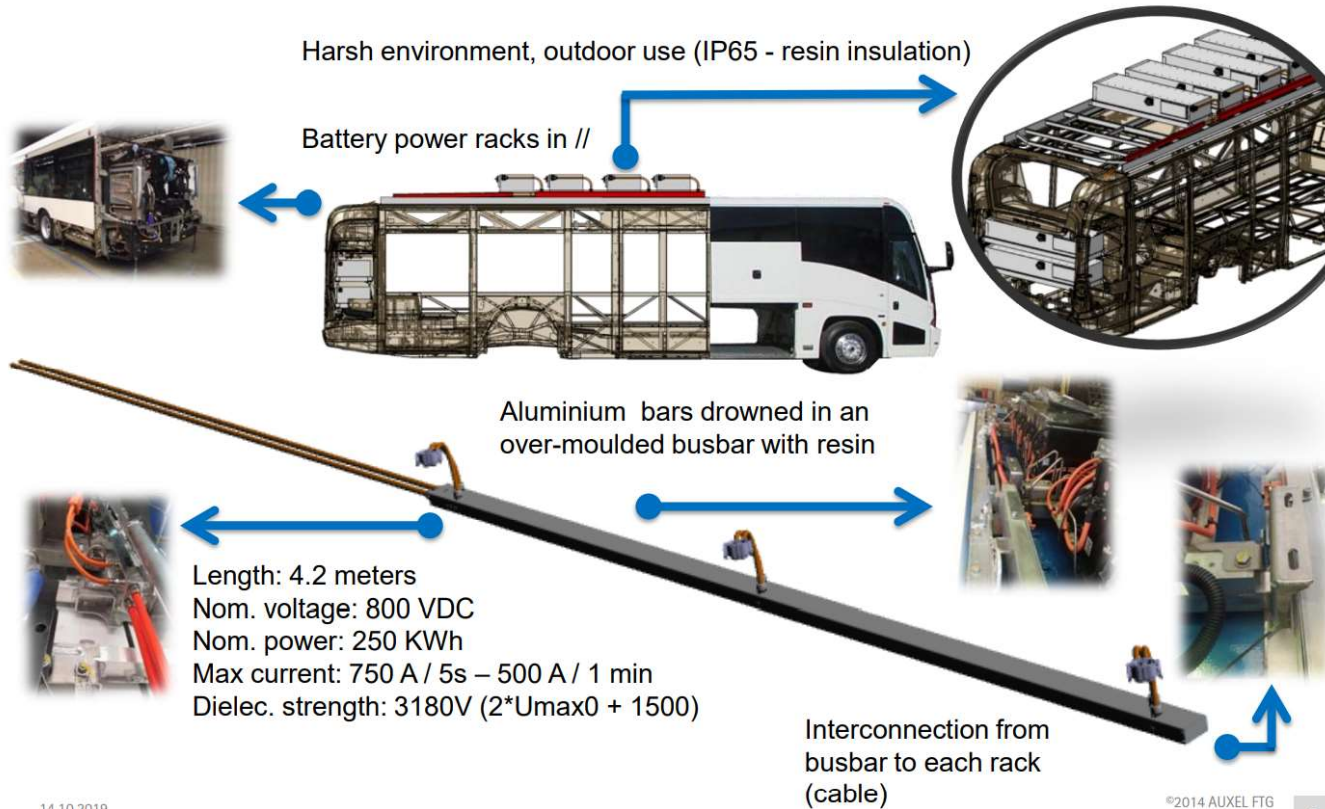
- Product code: CJP261
- Operating voltage: 3000V/1500V
- Operating current: 980A
- HiPot & PD tested – 100% mechanical & visual inspection

**TOSHIBA**

**Amphenol**  
IPC



# Example



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# Example

- Mitsubishi – train & metro



# Busbar Construction: Terminations



▶ Flex Tab



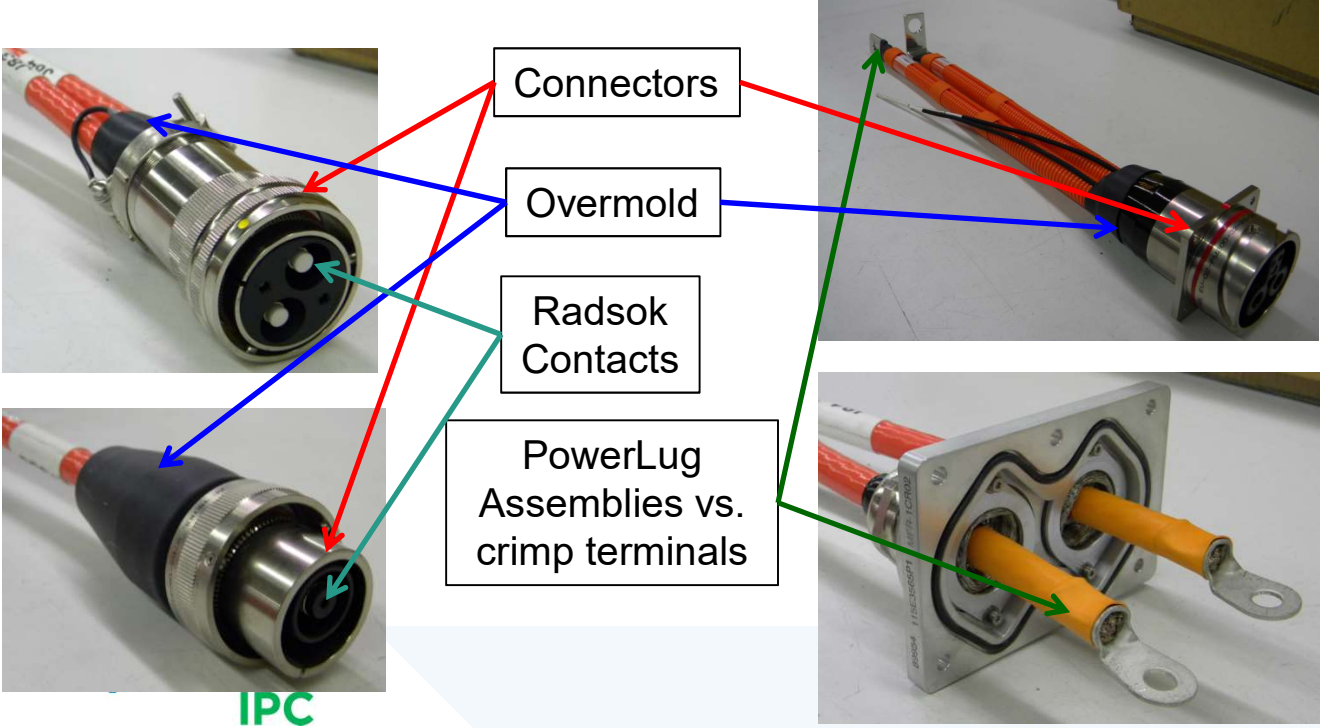
▶ Semi Flex Tab



# Examples for utilization of Power Interconnects

## Hybrid Truck/Bus Cable Assemblies

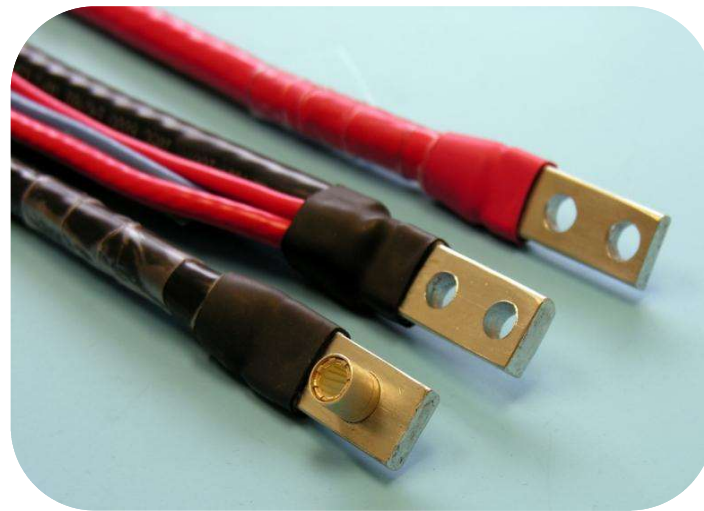
Battery Pack and Motor Connections



# Power Lug

## The Strongest Link in the Cabling System

PowerLug is a durable, low-voltage drop termination fabricated from the stranded ends of the cable itself. This very reliable “lug” is formed using stranded power cable. Since the wire is used to make the lug itself, the circuit current rating is limited only by the wire and not the lug.

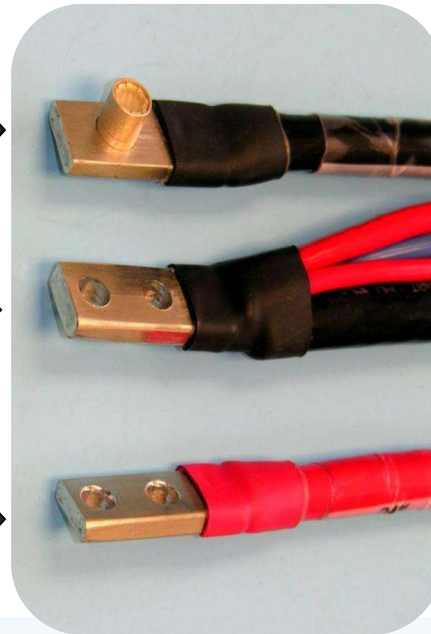


# Terminations

Various Angles



RADSOK® / SurLok®



Multi Cable Termination

1 or 2 hole; 180° 45° 90°

## Summary

- ▶ Large portfolio of power interconnects for automotive applications
  - Power disty busbars
  - Power conversion busbars
  - Powerlug
  - Custom power cables
- ▶ Experienced engineering team for custom power solution development
- ▶ Global manufacturing footprint
  - ISO and IATF certified
  - Low cost manufacturing solutions