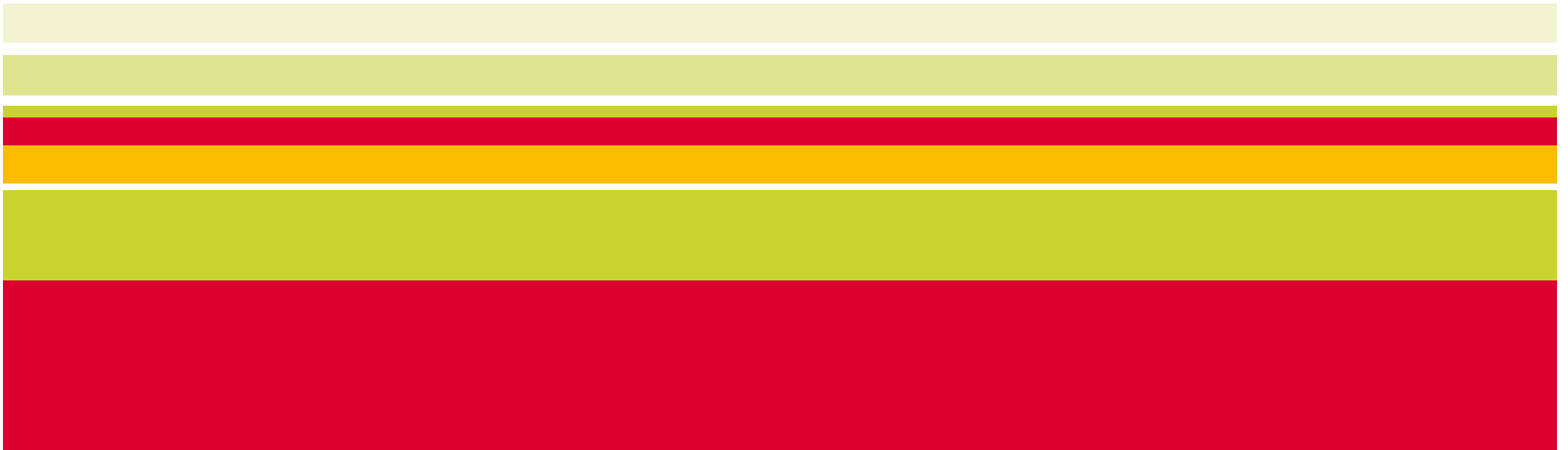




APEX[®] Product Line Overview

March 2008 – V3



- Thank you for your interest in APEX®. You are about to learn about one of the best connection systems available anywhere in the world.
- APEX® is a range of terminals and connectors designed for the rigorous demands of the automotive market, especially the engine and under-hood areas.
- These terminals and connectors are in use in millions of vehicles in North America, Europe and Asia and in non automotive applications, such as construction and agricultural equipment, worldwide.
- Manufactured in North America, APEX® products are shipped worldwide directly to major harness makers and made available to everyone through FCI's network of distributors.

When the performance of your electrical connection is important, go with FCI!

Is APEX® Right for You?



It is if....

- Your connector needs include one or more of the following:
 - High Temperature
 - Vibration
 - Moisture
 - Robust design
 - Reliable long life
 - and....
- Your customer's connector strategy includes APEX® or is neutral, and
- The mating device has been designed for APEX® (if applicable)

- APEX® is FCI's brand name for a terminal design philosophy:
 - Two-piece female terminal construction
 - High conductivity copper alloy for the box
 - High strength alloy for the leaf spring
 - Pre-loaded leaf spring – for insertion force reduction
 - High normal force contact – for vibration and high current rating
 - Fixed floor contact – for exceptional vibration stability
 - Clean body design – for robustness during handling
- Housings are offered in a variety of designs. Generally:
 - Plastic locking fingers with TPA terminal backup
 - Fully assembled with pre-staged TPA
 - Multiple key codes and colors
 - CPAs offered as options

- 1993 – First Automotive Application with Chrysler
 - **APEX® 2.8** product family was developed for Chrysler with the objective to eliminate warranty claims relative to wire harnesses
- 1999 – APEX® was miniaturized into the **APEX® 1.5** series for SRS connections featuring shorting bars
- 2002 – Detroit **Diesel** successfully introduced APEX® 2.8 onto the Series 60 engines and have seen electrical warrant reduced to below 1%.
- 2006 – the **APEX® 150** series was launched to bring APEX technology into a popular OEM cavity
- 2007 – the **APEX® Micro** is launched extending the APEX design philosophy down to the 0.64mm category

Today, APEX® is used at Chrysler, GM and Ford, not only in severe under-hood applications but in vehicle interior and safety restraint systems.

- APEX[®] was designed to address the following issues for the wiring design engineer:
 - Highly reliable – warranty reduction
 - Flexible for power and signal applications
 - Standardized terminal (sealed or unsealed)
 - Robust design
 - Easy to service in the field
 - Easy to assemble

Reliability

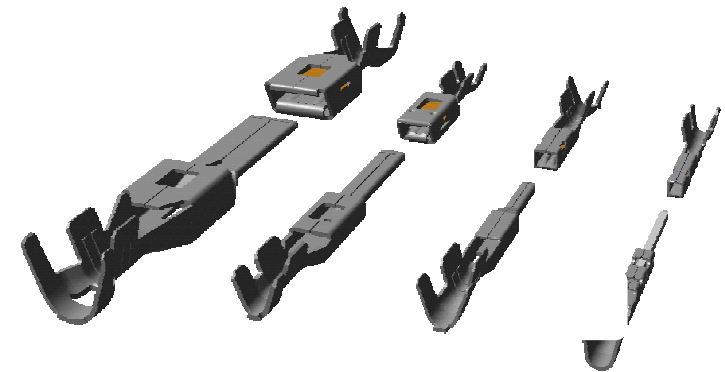
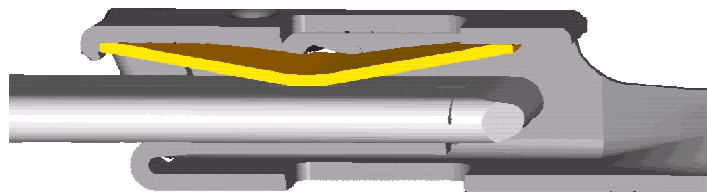
- Superior spring protection
- High normal force (stable high vibration interface)
- Consistent normal force
- GMW3191 T4/V4 capable with Tin or Tin-Silver
- More than 5 billion APEX[®] terminals shipped to date, 600 million plus annually, Less than 3 PPM
- Signature system in die spring normal force measurement

Compact

- APEX[®] 2.8 only industry leading mat seal compatible terminal

High Value

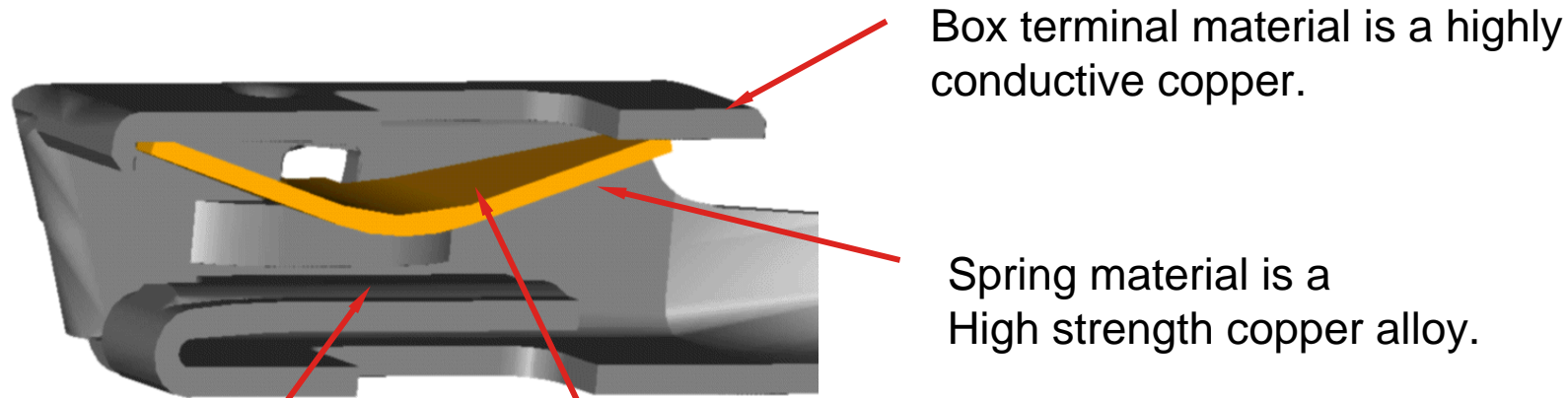
- Optimized material utilization/cost
- Connector terminal pitch density is best-in-class



APEX[®] Female Terminal Design



- The female terminal body is made of highly conductive copper and incorporates a high strength copper alloy spring that is press fit into the female box.
- Many APEX[®] terminals require no polarization in the connector



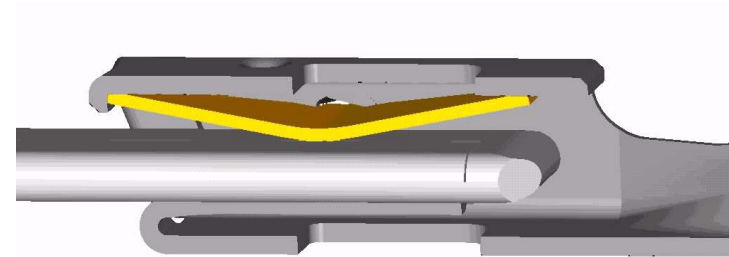
Raised rib contact surface

- very stable platform
- minimum 2 points of contact
- wiping action

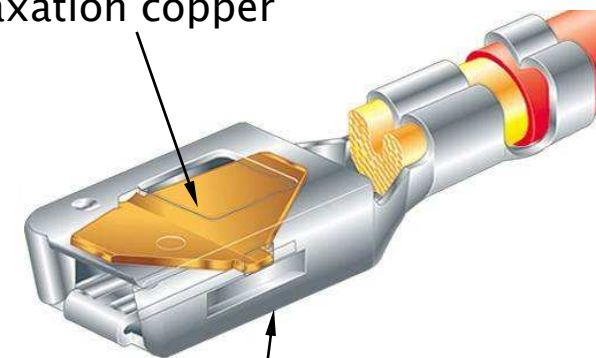
Pre-loaded spring

- extra point of contact
- low insertion force
- repeatable normal force

- The APEX[®] two piece terminal design has inherent advantages:
 - Offers best-in-class stamping material utilization
 - Optimum cost/performance material selection (spring and body)
 - Superior spring damage protection

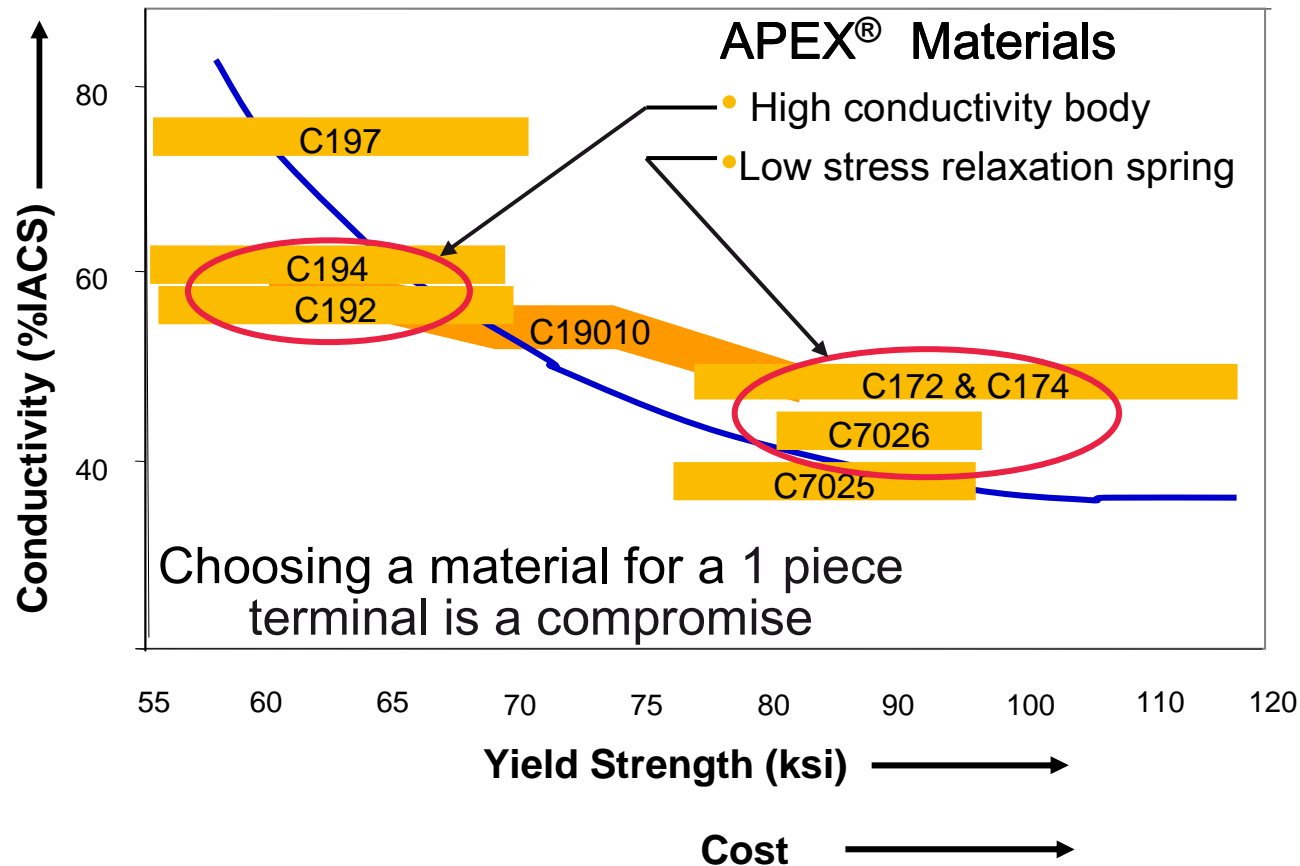


Copper alloy spring material is a Low stress relaxation copper



Highly conductive low cost Copper Alloy box material

Two Piece Terminal Performance Advantage



...2 piece female terminals do not compromise on material cost-performance

APEX[®] Terminal Technology



APEX[®] terminal family design features

Mat Seal Compatible



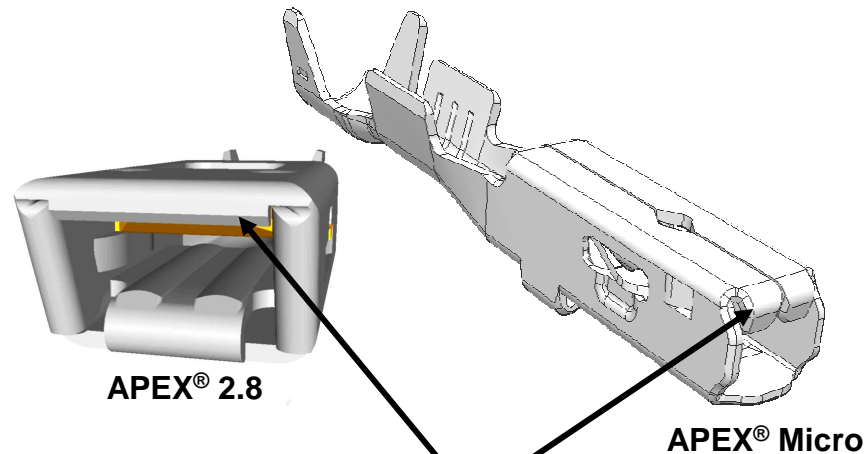
High bend strength



Consistent Insertion Force



No false lock in Plastic

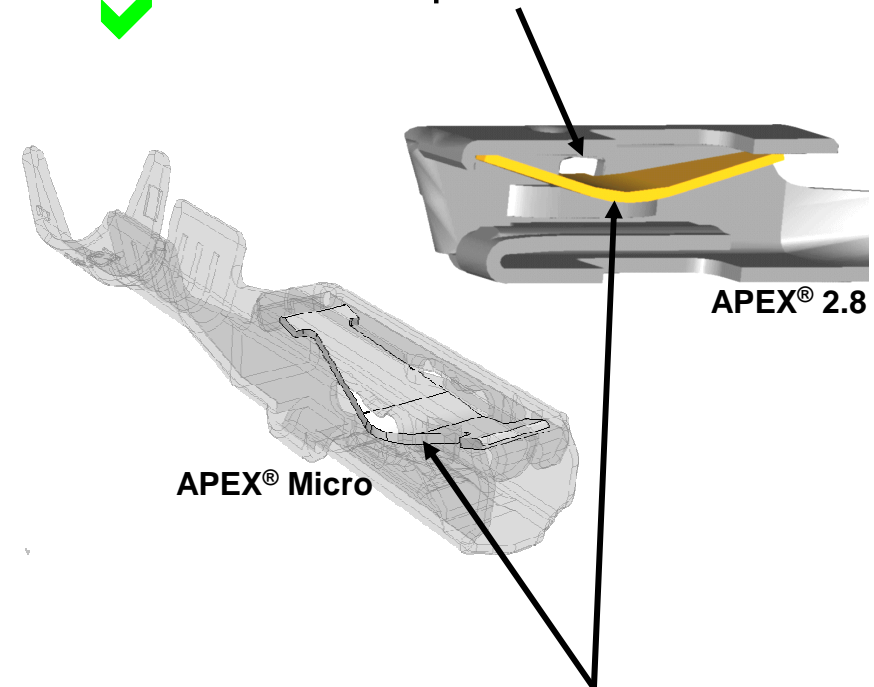


Spring Protection



- Forward cavity stop compatible
- Pogo/Blade damage resistant

Overstress protection feature



Preloaded APEX[®] beam



- **APEX[®] Micro** – 0.64/1.2mm terminal system, female accepts 0.64mm and 1.2mm industry standard blades, capable of 2.5mm pitch – **Targeted to High-Density Header Applications, up to 13A**
- **APEX[®] 1.2** – 1.2mm female terminal for high current applications, capable of 3.5mm pitch – short terminal, high normal force – **Targeted to Engine Sensor Applications, up to 18A**
- **APEX[®] 150** – 1.5mm terminal system compatible to OEM cavity specification – **General Duty, 3.5mm pitch, up to 20A**
- **APEX[®] 1.5** – Same design as APEX 1.2 above, 1.5mm terminal system, capable of 3.5mm pitch, high normal force – **For customers that prefer 1.5 size, up to 20A**
- **APEX[®] 2.8** – The original APEX, a 2.8mm terminal system capable of 5.0mm pitch – High normal force – **Targeted to the Motorized Vehicle Market and high current applications in Automotive, up to 40A**
- **APEX[®] 6.35** – 6.35mm terminal system – **Specialty High Power, up to 55A**
- **APEX[®] 950** – 9.5mm terminal system in development for high current applications – **Targeted to hybrid vehicle applications, up to 100A**

Current ratings are maximum tested in a connector. Specific applications may require further de-rating.

FCI likely has a system to meet your needs.

APEX[®] Micro

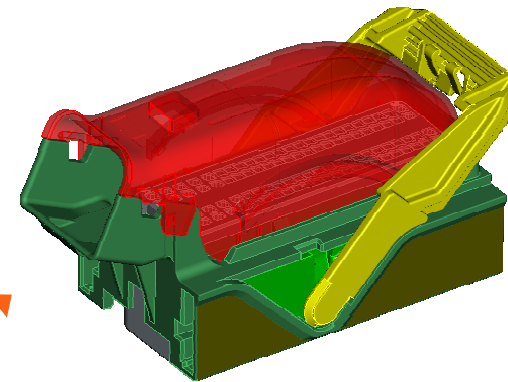
“Our smallest APEX[®] product”

■ Terminals

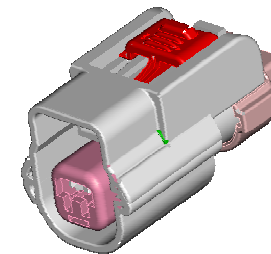
- Female accepts 0.64mm and 1.2mm industry standard blades
- Capable of 2.5mm connector pitch
- Polarized
- Signal circuits - up to 13 A*

■ Connectors

- High-Density Header Applications
- USCAR 0.64 category interface compatible (2.5mm pitch)



58-way and 96-way Sealed Female connectors available



2-way Sealed Female connector available

* For reference only. Maximum continuous current, on the largest available wire, in the connector.

APEX[®] 1.2

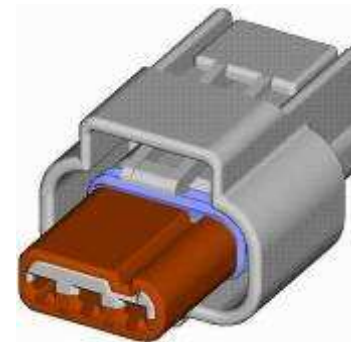
“Our popular Sensor Connectors”

■ Terminals

- Female accepts the 1.2 mm industry standard blade
- High normal force – for exceptional on-engine vibration performance
- Short terminal body design – enabling compact connectors
- No Polarization
- Signal circuits - up to 18 A*

■ Connectors

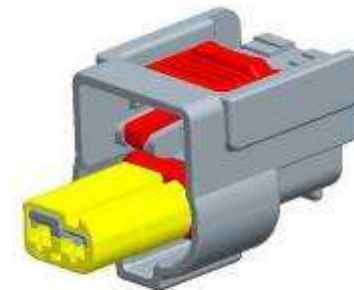
- Popular German “VDA/AK Interface” for various engine sensors
- Availability:
 - 3-way and 4-way – Now
 - 2-way – being prototyped
 - 5-way thru 8-way – designed



3-way



4-way



2-way

* For reference only. Maximum continuous current, on the largest available wire, in the connector.

APEX[®] 150

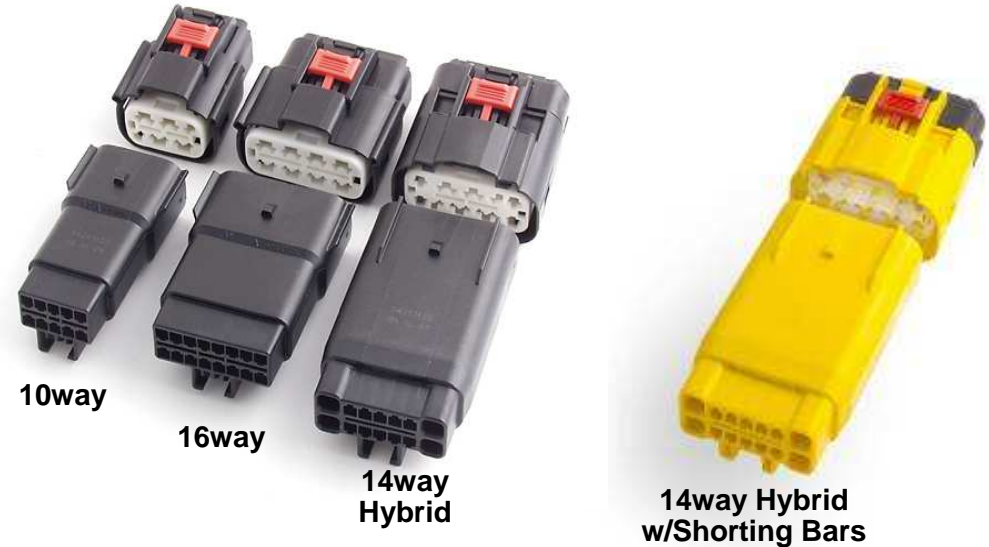
“Our USCAR offering”

Terminals

- 1.5 mm box & blade system – cavity compatible with Molex, Yazaki
- Up to 16 circuits without need for mate-assist
- Polarized
- Signal & mid-power circuits - up to 20A*

Connectors

- Popular USCAR 1.5 mm Sealed Interface for wire-to-wire applications
- Hybrid configurations (including APEX[®] 2.8 terminals for higher power circuits)
- FCI exclusive ErgoMate[™] mate assist system
- Availability:
 - 10, 14, 16-way – Now
 - 24-way ErgoMate[™] - Now
 - Others – designed



24-way ErgoMate[™]

* For reference only. Maximum continuous current, on the largest available wire, in the connector.

APEX[®] 1.5

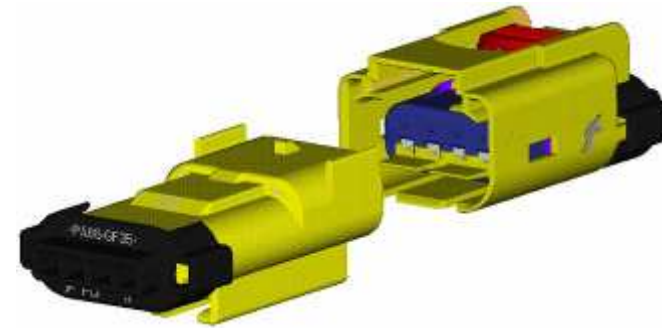
“Our SRS Shorting Bar Sectioning Connectors”

■ Terminals

- 1.5 mm box & blade system
- High normal force – for exceptional vibration performance
- Short terminal body design – enabling compact connectors
- No Polarization
- Signal & mid-power circuits - up to 20A*

■ Connectors

- A 4-way single row configuration
- 2-way available (plugged cavities)
- Sealed: 16 – 20 gage wire
- Unsealed: 14 – 22 gage wire
- Up to 2 shorting bars



* For reference only. Maximum continuous current, on the largest available wire, in the connector.

APEX[®] 2.8

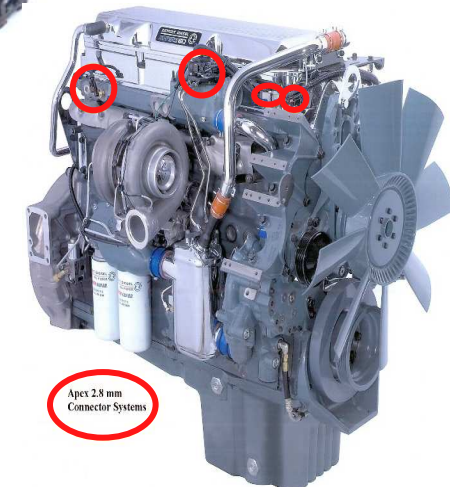
“The Original. Our Best Seller”

■ Terminals

- 2.8 mm box & blade system
- High normal force – for exceptional vibration performance
- No Polarization
- Signal & mid-power circuits - up to 40A*

■ Connectors

- Sealed: 12 – 20 wire gage
- Unsealed: 10 – 22 wire gage
- Fully assembled, Robust designs
- Bosch interface 2 & 3 ways
- Lighting connectors in development



* For reference only. Maximum continuous current, on the largest available wire, in the connector.

APEX[®] 950 In Development

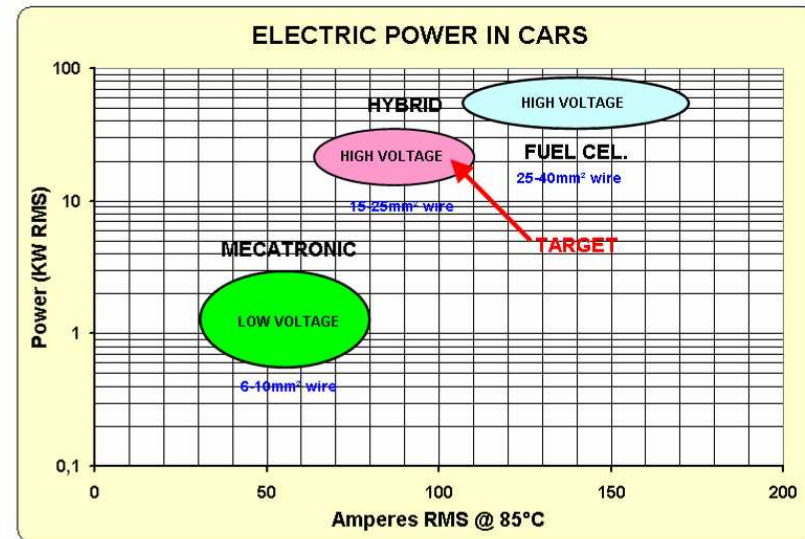
“Our Largest APEX product for High Power”

Terminals

- Based on proven APEX[®] technology
- Mates to typical 9.5x1.2mm terminal blades
- High reliability – high normal force
- 15mm terminal pitch (non sealed, non shielded)
- High Current – up to 100A*

Connectors

- 1, 2, and 3 way sealed
- High Voltage capable
- Shielding continuity
- Safety Interlock available



* For reference only. Maximum continuous current, on the largest available wire, in the connector.



Thank - You

