

# Commercial & Specialty Vehicle Connection Systems



**DELPHI**

Innovation for the Real World

# Commercial & Specialty Vehicle Connection Systems

Delphi Connection Systems has a global reputation for producing high quality electrical/electronic connectors and connection systems that meet and exceed customer requirements around the world. The technology and processes developed for our connection systems products are the result of our extensive customer focus and drive for innovation. It is our commitment to continue to work with customers to develop and deliver connection products that meet the ever-increasing standards of quality and performance for the commercial vehicle markets.

Delphi employs leading edge manufacturing technologies and a comprehensive range of design services to produce high performance, cost-effective connection systems available either off-the-shelf or custom designed. We design, manufacture, assemble, validate and deliver electrical/electronic connection products to meet customer's stringent manufacturing and performance requirements.

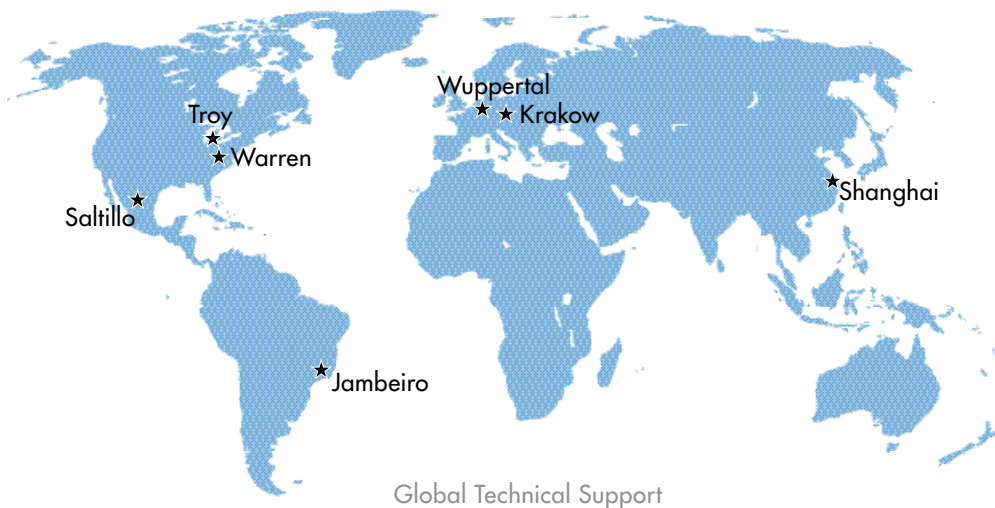
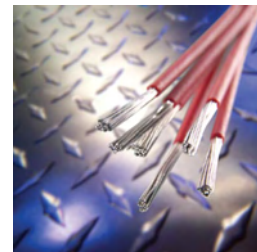
## Delphi Advantages:

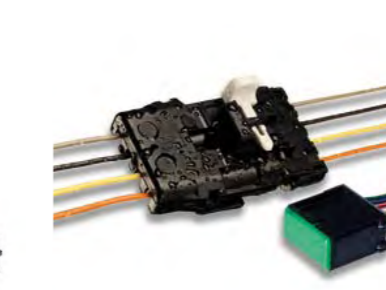
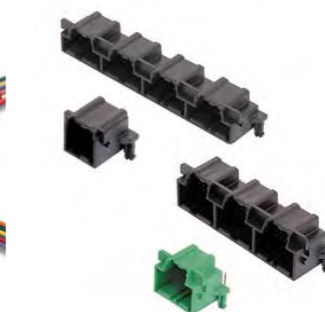
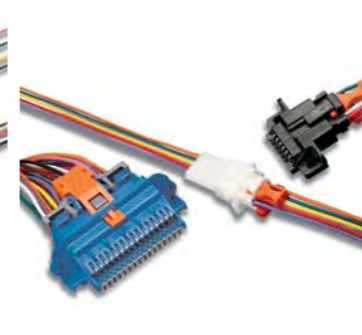
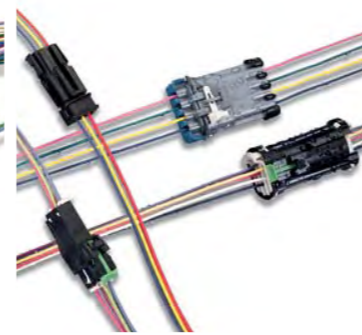
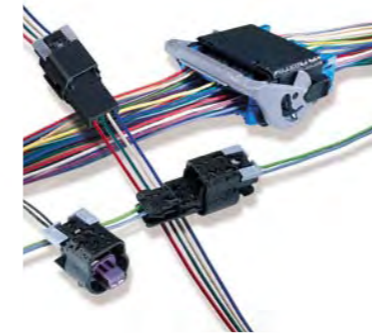
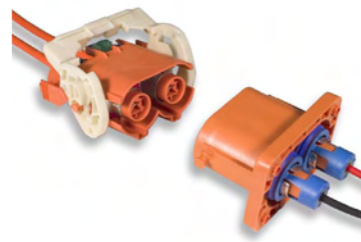
- Extensive multi-industry product portfolio
- Global collaboration with local execution
- Global participation on standard committees
- Global Electrical/Electronic architecture supplier
- Expertise connector application advanced development
- Integrated systems approach
- Development of customer focused solutions

Delphi offers an extensive Portfolio of product solutions for our global customers. Our comprehensive product line ranges from signal-level through high-power connection systems. These include both unsealed and sealed, ergonomically designed connections for in-line, device and header applications. This varied portfolio positions us to be a single-source provider.

**Typical Markets:** Delphi Connection Systems' commercial and specialty vehicle connectors are designed for a wide range of product applications including:

- Commercial vehicles
- Construction/Agriculture vehicles
- Electric vehicles
- Marine vehicles
- Military/Aerospace
- Motorcycles/Specialty vehicles

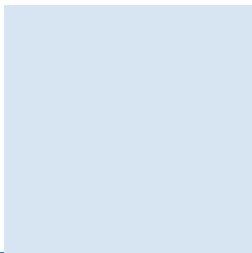




Connector Family	Harsh Environment Series (HES)	High Power/High Voltage	Power Pack 1000/2000	Data Connectivity	RF Coax Cable Assemblies	GT	Metri-Pack	Micro-Pack	064	Weather Pack	Additional Components	Electrical Center
Connector Type	Circular Connector Size 24 Shell Terminal patterns 19, 21, 23, 29, 31, 47 Terminals 1.0/20G, 1.6/16G J1939 Diagnostic Connector	Connections designed for 42V-600V DC and AC Minimum shielding effectiveness of 40 dB (150 KHz to 200 MHz) – ensures EMI protection Connection systems to handle wide current ranges: - 120A-200A (13 mm <sup>2</sup> -62 mm <sup>2</sup> conductor) - 80A-120A 9.5 mm terminal system (8 mm <sup>2</sup> -13 mm <sup>2</sup> conductor) - <40A 4.8 mm and 6.3 mm system (2 mm <sup>2</sup> -5 mm <sup>2</sup> conductor)	2W Connector - In-line - Right Angle Terminals M/F Connector Seals Cable Seals TPA's CPA's Terminal Lock Seal Retainer	Full system complement of components - Ports - Hubs - Bezels - Headers - Hubs - Cables	Coaxial cables	150 280 Headers Lever lock Mixed SlimLine	150 Series 280 Series 480 Series 630 Series 800 Series Headers Junction Mixed	100 Series (unsealed) 100W Series (sea)	One and two row unsealed header connectors Mixed series header connector Unsealed mating female connectors	Pin and sleeve	Assembly coverings and channels Brackets, clamps, and clips Cable seals Fuse holders and lamp sockets Ring and battery terminals Splice savers Tie strap/clip assemblies	Sealed PCB Hybrid EC
Features/Benefits	<ul style="list-style-type: none"> <li>- Terminal designed for lower insertion forces</li> <li>- Size 20 and 16 available,</li> <li>- 3-rib design provides better sealing capability up to 50% compared to existing designs</li> <li>- Environmentally sealed to IP67</li> <li>- Robust, specialized finger design virtually eliminates terminal unseats</li> <li>- Validated for interchangeability with industry standard products</li> <li>- Male pin and female socket terminal cavity compatible with all industry pin and socket connections</li> <li>- Frontward/backward compatibility</li> <li>- Rugged construction to withstand harsh environments</li> <li>- Sonic welded design provides 360 degrees of contact to withstand high vibration to meet J-2030 standards</li> <li>- Validated to SAE J-2030 and various other customer specifications</li> </ul>	<ul style="list-style-type: none"> <li>- Shielding connection to control radiated emissions and EMI</li> <li>- Terminal cavities isolated to protect against short circuit between high voltage terminals</li> <li>- HVIL (Hazardous Voltage Interlock) available to protect during service operation</li> <li>- Systems offering internal and external shielding</li> <li>- Panel mount header with mating harness connector</li> <li>- Custom designed connection systems to meet customer specifications</li> <li>- Shield interface sealed from environment (no galvanic degradation)</li> <li>- Leverage product development expertise to address all on- and off-road requirements</li> </ul>	<ul style="list-style-type: none"> <li>- High-current carrying capability - Power Pack 2000 – 250 amps - Power Pack 1000 – 145 amps</li> <li>- Hand engage/disengage eliminates the need for tools and reduces manufacturing time</li> <li>- Individually sealed terminal cavities for redundant sealing protection</li> <li>- Terminal system can mate in the in-line or right-angle direction</li> <li>- Connector Position Assurance (CPA) and Terminal Position Assurance (TPA) for superior connection reliability</li> <li>- Robust vibration performance in harsh environments</li> </ul>	<ul style="list-style-type: none"> <li>- Unsurpassed global solution provider for all</li> <li>- Data Connectivity protocols. - USB - LVDS - 1394 - Ethernet</li> <li>- Engineered for various data protocols - USB - 1394 - MOST</li> <li>- Designed to meet commercial and specialty vehicle applications and standards</li> <li>- A global leader in manufacturing connectors, cable assemblies, terminals and wiring harnesses</li> </ul>	<ul style="list-style-type: none"> <li>- Flexible manufacturing cells allow high volume/low mix and low volume/high mix</li> <li>- Extensive experience in transportation E/E Architecture design and manufacturing</li> <li>- Fully certified testing/validation lab</li> <li>- Full participation in global standards activities</li> </ul>	<ul style="list-style-type: none"> <li>- Tangless terminals</li> <li>- Low engagement force</li> <li>- Pumphandle primary lock</li> <li>- Secondary lock, Connector Position Assurance (CPA), and Terminal Position Assurance (TPA) capabilities</li> <li>- Mates to ISO, SAE blades</li> <li>- Conforms to USCAR design footprint</li> <li>- Cam lever/mechanical assist or hand engage/disengage</li> <li>- Optimized content packaging for space efficient terminations</li> <li>- Pre-staged male blade stabilizer or superior male blade protection</li> <li>- Mixed terminal capability or design flexibility</li> <li>- Protected seal interface</li> <li>- Enhanced terminal</li> </ul>	<ul style="list-style-type: none"> <li>- Enhanced products for high performance/high vibration</li> <li>- Validate to SAE J2030 Tangless terminals for durable design</li> <li>- Silver and gold plating</li> <li>- Used in high current to low energy circuits</li> <li>- Strength and stability of terminals help assure correct alignment</li> <li>- Utilizes internationally standard male blade sizes for design flexibility</li> <li>- Connector Position Assurance (CPA) and Terminal Position Assurance (TPA) for superior connection reliability</li> <li>- Sealed version for excellent resistance to temperatures, chemicals, and abrasion</li> <li>- Silver and gold platings</li> </ul>	<ul style="list-style-type: none"> <li>- Low energy (&lt;5A), high density capabilities allow many electronic signals to be accommodated in one space saving connector</li> <li>- Filtered or shielded systems protect against Electromagnetic Interference (EMI)</li> <li>- 3.0 mm to 3.5 mm centerlines accommodate applications where space is limited</li> <li>- Mechanical assist and bolt-together designs enable ergonomic assembly/disassembly</li> <li>- Improved one-piece (vs. two-piece) female terminal for sealed applications</li> <li>- Sealed version for excellent resistance to temperatures, chemicals, and abrasion (100V)</li> <li>- Connector Position Assurance (CPA) and Terminal Position Assurance (TPA) for superior connection reliability</li> </ul>	<ul style="list-style-type: none"> <li>- USCAR compliant</li> <li>- Intermateability</li> <li>- Interchangeability</li> <li>- Sealed and unsealed versions</li> <li>- Hand-mateable connections (75N maximum engage force)</li> <li>- Optional gold plated interfaces enhance reliability</li> <li>- Secondary terminal lock provides enhance robustness</li> <li>- Connector Position Assurance (CPA) for superior connection reliability</li> <li>- Optional color coding by index</li> </ul>	<ul style="list-style-type: none"> <li>- Sealed system specifically designed to withstand exposure to extreme temperatures, chemicals, and fluids</li> <li>- Pin and sleeve configuration to alleviate stress relaxation</li> <li>- Secondary lock and Connector Position Assurance (CPA) for improved system design</li> <li>- Dual-locking tangs on terminals help prevent backing out</li> <li>- Terminal plugging requires no orientation</li> <li>- Positive locking indexing prevents mismatching of connectors</li> <li>- Low energy, low voltage capability for vehicle electronics</li> </ul>	<ul style="list-style-type: none"> <li>- Durable and proven designs</li> <li>- Harness attachment devices designed for automotive and transportation products</li> <li>- Ergonomic and assembly efficient designs, including orientation features</li> <li>- Custom designed solutions for customer specific applications</li> </ul>	<ul style="list-style-type: none"> <li>- Design enables automatic assembly of fuses and relays</li> <li>- Offers the versatility of custom designs, with the economics of off-the-shelf modules</li> <li>- All mini- and maxi-fuse centers have bussing capability to reduce the number of leads required</li> <li>- All mini- and micro-relays are designed for motor and resistive load applications and are a "plug-in" type of relay designed for use in electrical centers</li> <li>- All modular electrical centers utilize secondary lock combs that are custom designed to match the module</li> </ul>
Typical Markets	<ul style="list-style-type: none"> <li>- Commercial vehicles</li> <li>- Construction vehicles</li> <li>- Military vehicles</li> <li>- Marine vehicles</li> </ul>	<ul style="list-style-type: none"> <li>- Commercial vehicles</li> <li>- Electric vehicles</li> </ul>	<ul style="list-style-type: none"> <li>- Commercial vehicles</li> <li>- Construction/Agriculture vehicles (heavy duty trucks)</li> </ul>	<ul style="list-style-type: none"> <li>- Construction/Agriculture</li> <li>- Commercial vehicles (heavy duty truck)</li> <li>- Construction - Off-Road</li> </ul>	<ul style="list-style-type: none"> <li>- Construction/Agriculture</li> <li>- Commercial vehicles</li> <li>- Marine vehicles - Motorcycles</li> </ul>	<ul style="list-style-type: none"> <li>- Commercial vehicles</li> <li>- Marine vehicles</li> </ul>	<ul style="list-style-type: none"> <li>- Commercial vehicles</li> <li>- Marine vehicles</li> </ul>	<ul style="list-style-type: none"> <li>- Commercial vehicles (medium duty vehicles)</li> <li>- Construction/Agricultural vehicles</li> </ul>	<ul style="list-style-type: none"> <li>- Construction/Agriculture vehicles</li> <li>- Commercial vehicles</li> <li>- Marine vehicles</li> </ul>	<ul style="list-style-type: none"> <li>- Agriculture</li> <li>- Commercial vehicles</li> <li>- Lawn &amp; garden</li> </ul>	<ul style="list-style-type: none"> <li>- Buses</li> <li>- Marine Veh.</li> <li>- RVs</li> </ul>	
Typical Application	<ul style="list-style-type: none"> <li>- Delphi's HES is ideally suited for making connections in a vehicle sheet metal firewall pass-through location.</li> <li>- Intended for use in any high density, in-line application.</li> </ul>	<ul style="list-style-type: none"> <li>- High 300V battery pack</li> <li>- Inverter modules</li> <li>- Control modules</li> <li>- Belt driven accessories</li> <li>- Power distribution center</li> <li>- BEC</li> <li>- Transmission</li> <li>- Power steering</li> </ul>	<ul style="list-style-type: none"> <li>- Delphi's Power Pack Connectors are an ideal fit for high-current/high-power sealed and unsealed applications</li> <li>- Electrical center power feed</li> <li>- Electric power steering</li> <li>- Front wall pass-through</li> <li>- High-current module interface</li> <li>- Hybrid vehicle modules</li> <li>- In-line for battery cable</li> </ul>	<ul style="list-style-type: none"> <li>- Entertainment</li> <li>- Controls</li> <li>- Navigation</li> <li>- Safety</li> </ul>	<ul style="list-style-type: none"> <li>- Ground position sensors and antenna applications</li> </ul>	<ul style="list-style-type: none"> <li>- Ergonomic connections for in-line, device, header, and bulkhead applications</li> </ul>	<ul style="list-style-type: none"> <li>- Flat blade connections for electronic through high current applications</li> </ul>	<ul style="list-style-type: none"> <li>- 1 mm pin connections for low power and electronic devices</li> </ul>	<ul style="list-style-type: none"> <li>- Satellite radios</li> <li>- Infotainment devices</li> <li>- Body modules and systems</li> <li>- HVAC systems</li> </ul>	<ul style="list-style-type: none"> <li>- Proven harsh environmentally sealed connections</li> </ul>	<ul style="list-style-type: none"> <li>- General commercial vehicle and transportation electrical distribution attachment needs</li> </ul>	<ul style="list-style-type: none"> <li>- Full range of power distribution applications, including stringent underhood environments</li> </ul>

Extended Product Range Offers Significant Design and Application Versatility





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