

Connectors for Industrial Applications



• APTIV •

Aptiv is a global technology company that enables a safer, greener and more connected future with scalable hardware and software solutions.

Our **Connection Systems** business offers a full range of connectivity products for power and data applications.

The portfolio includes low- and high-voltage connectors for conditions ranging from light duty to harsh environments, as well as high-speed data connectors that support increasing bandwidth requirements.



Aptiv Connection Systems

PIONEERING MODERN CONNECTIVITY SOLUTIONS

Global Excellence in Connectivity

Aptiv Connection Systems stands at the forefront of electrical and electronic connectivity innovation, delivering premium connection systems that consistently exceed global customer expectations. We remain dedicated to collaborating with partners to develop connectivity solutions that meet the increasingly demanding quality and performance standards in today's market sectors.

Advanced Manufacturing & Design Capabilities

We create high-performance, cost-efficient connection systems available as both off-the-shelf and custom solutions. Our end-to-end approach encompasses the design, manufacturing, assembly, validation and delivery of electrical/electronic connectivity products that satisfy the most stringent industry requirements.

Versatile Solutions Portfolio

Our diverse product lineup spans from signal-level to high-power connection systems, featuring both unsealed and sealed, ergonomically designed connections for inline, device and header applications. Our comprehensive offerings position Aptiv as a trusted single-source connectivity partner.

Market Applications

Aptiv Connection Systems delivers specialized connectivity solutions across several sectors:

- Agricultural equipment
- Automotive
- Construction machinery
- Energy market and power applications
- Industrial and robotics applications
- Marine applications
- Mass transit systems
- Medium- and heavy-duty trucks
- Motorcycle technology
- Recreational vehicles
- Urban air mobility (eVTOL)

The Aptiv Difference

Comprehensive Product Ecosystem

An extensive range of connectivity solutions

Pioneering Interconnect Technologies

At the cutting edge of the industry

Cross-Industry Expertise

Deep knowledge across multiple connector applications

A Holistic Systems Approach

Integrated solutions rather than isolated components

Customer-Centric Innovation

Solutions developed around real client needs

Exceptional Service Standards

Consistently exceeding customer expectations

A Robust Global Presence

Seamless support across international markets

Connector Series for Industrial Applications



NANOPACK™ CTS

Miniaturized connectors engineered for reliability in compact electronic applications



CTS 1.2 SEALED

Sealed connection system delivering compact, reliable performance for harsh operating environments



HIGH SPEED DATA CONNECTORS

Compact connectors supporting up to 56 Gbps to simplify integration of data and power for sensors, cameras, lidars and modules

CONNECTOR & TERMINAL RANGE

- 0.5 mm Series
- 2-way to 24-way configurations
- Inline, headers, mixed and device
- 105 °C maximum temperature
- IP67 and IPx9K sealed or unsealed
- 90° left/right or 180° covers (sealed)
- Sn or Ag plating

- 1.2 mm Series
- 2-way to 6-way configurations
- Inline and device
- Maximum current: 18.7A
- 175 °C maximum temperature
- Cable-sealed
- Sn or Ag plating

- High Speed FAKRA
- Mini-coax connectors
- Automatable Modular Ethernet Connectors (AMEC)
- AMEC™-H High-Speed Modular Twisted-Pair Data (H-MTD®)

FEATURES & BENEFITS

- Heavy-duty performance
- Ergonomic design
- Robust contact geometry
- Designed for high temperatures and vibration profiles
- Independent Secondary Lock (ISL) to detect partially installed terminals
- Best-in-class lock overstress protection
- Designed for automated harness assembly
- CPA (Connector Position Assurance) optional

- Short shroud design for small packaging footprint and long shroud design for easy mating of devices
- One-piece molded housing ensures best-in-class sealing performance
- Increased sealing performance through a unique three-rib robust seal design (175 °C version)
- Patented Smart Locking System version of the CPA prevents unmating in high vibration environments
- Compatible with wire dress back shells

- Multi-gigabit data rates and power over coax
- Sealed and unsealed
- Stable performance across various temperatures and frequencies
- Anti-stubbing technology
- Highest mechanical robustness
- Wide range of cable types
- Serviceable designs

TYPICAL APPLICATIONS

- Control handle signal
- Joystick PCB wiring
- BMS Signal
- Cooling fans
- Lighting systems
- Vehicle dashboard indicator wiring
- Sensor wiring
- CAN networks

- Sensor wiring
- Lighting systems
- Open operator station and cab wiring
- Joystick and pedal controls
- Horn or alert system
- Valve manifold hydraulics
- Transmission harness

- Cameras
- Antennas
- Smart sensors and modules
- Infotainment
- Autonomous driving
- Radar
- Lidar
- Industrial ethernet

Connector Series for Industrial Applications



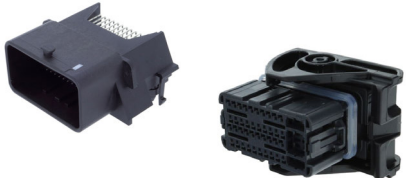
OCS 1.5 SEALED

Full inline and device connector series designed for improved reliability and a variety of uses across industries



APEX™ 2.8 SEALED

Ergonomic design and heavy-duty performance to withstand heat, vibration and moisture in harsh conditions



CMC

Patented design ensures secure, durable connections with 15G vibration resistance

CONNECTOR & TERMINAL RANGE

- 2-way to 16-way, female and male
- Six standard indexes
- Primary lock reinforcement (PLR)
- CPA available
- 21A continuous maximum current rating
- -40 °C to +125 °C operating temperature range
- IP69K-rated sealing

- 2-way to 14-way configurations
- Inline and device
- 40A maximum current
- 150 °C maximum temperature
- Mat-sealed; IP68-rated

- Male (wire-to-board) and female (cable housing)
- 32-, 48-, 64- and 86-way configurations
- 0.64 mm, 1.5 mm and 2.8 mm blade sizes
- Sealed applications
- 0° and 45° angle dress covers

FEATURES & BENEFITS

- Compatibility with industry standard mating interfaces
- Robust reliability and designed-in durability
- Housing lock overstress protection to prevent lock relaxation or damage
- Polyester resins for an enhanced audible click, to improve operator build feedback and dimensional stability in all seasons
- Optimized PLR for improved terminal unseat detection
- Cavity designed with a positive forward stop to prevent terminal push-through
- Optimized optional CPA that provides additional lock performance to ensure connectors stay mated

- Industry's most compact 2.8 mm system
- Fully protected interface seal
- PLR and CPA to ensure connection integrity
- Mechanical polarization to eliminate mis-mates
- Proven environmental sealing in harsh environments

- High retention force
- Standard interface interchangeable with multiple suppliers
- Easy cable assembly
- First mate, last break layout for safe connection
- Patented TPA front holder latch for lock and unlock
- Patented polarization by rear seal holder at earliest stage of terminal insertion
- Mat-seal is pre-closed on the 0.64 mm terminal cavities eliminating cavity plugs
- Clean body terminals prevent mat-seal damage

TYPICAL APPLICATIONS

- Sensor wiring
- Telematics/ECU I/O
- Cooling pump wiring
- Blowers and fans
- Instrument panel wiring
- Solenoid connections
- Navigation and control PCB

- Battery power distribution module
- Hydraulic pump control harness
- Sensor connections
- Traction inverter control
- High-current auxiliary circuits
- Cab electrical pass-through

- Pump motor - hydraulic
- Steering assist
- Solenoid signal
- Transmission wiring
- Cooling fans

* H-MTD® is a registered trademark of Rosenberger Hochfrequenztechnik GmbH & Co.

Connector Series for Industrial Applications



CTCS XP/SP & FLEX

Surpassing the industry's toughest standards set by leading commercial vehicle manufacturers



HES

Circular connectors engineered for uncompromising performance in extreme environments



POWERPACK LV1000

High current carrying capacity, a proven terminal system and a compact design

CONNECTOR & TERMINAL RANGE

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|---|---|--|
| <ul style="list-style-type: none">• Inline and device applications• 2-way to 62-way configurations• 1.5 mm, 2.8 mm and 6.3 mm blade sizes and mixed cavity configurations• Sealing: IP67 / IP6K7-rated against water intrusion; IP69 / IP6K9K-rated sealing against high pressure spray• Flame-retardant V0 material option• Panel, strap/clip and bracket male mounting options• Modular mixed data, power and signal connections• Two lock-assist mechanisms for sealed connectors: slider lock and lever lock | <ul style="list-style-type: none">• 24 shell connectors• Six terminal patterns• Standard/reverse configurations• Thin wall, regular wall and heavy wall• 19 mm, 22 mm and 25 mm conduit adapters, straight and right angle• 50-way to 60-way header system• Pin/sleeve terminals compatible with MIL 390329 industry standard cavity• Ni or Au plating | <ul style="list-style-type: none">• Inline, device and pass-through applications• 1-way and 2-way configurations• Straight and right-angle versions• 120A continuous maximum current rating• 48V maximum DC voltage• -40 °C to +125 °C operating temperature range• IP67 / IP6K9K-rated sealing• Unshielded |
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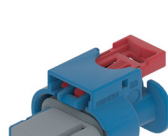
FEATURES & BENEFITS

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| <ul style="list-style-type: none">• Optional back shells in 180° and 90° angles with additional ribbing provide improved vibration resistance• The zero-gap back shell design protects against dust and debris ingress• Secure locking features prevent accidental connector release before full mating• A patented housing design and an enhanced terminal contact spring deliver superior vibration performance• The FLEX version features a modular design for customizable combinations of data, power and signal terminals• A robust, ergonomic slider design enables easy handling | <ul style="list-style-type: none">• Three-rib seal design for up to 57% higher performance• Up to 44% higher terminal retention while reducing plugging force• Validated to SAE J2030• HES terminals for improved electrical performance• Ergonomic harness assembly• Assembly benefits: lock window and alignment arrows; color-coordinated seals | <ul style="list-style-type: none">• High current carrying capacity• Proven terminal system• Compact system design• Field-proven in heavy duty applications• Silver-plated multi-contact terminal system• Sealed panel-mount pre-stages prior to fastening• Panel-mount secured in place with self-tapping screws• Pass-through connection accepts both straight- and right-angle connectors |
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TYPICAL APPLICATIONS

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|---|---|---|
| <ul style="list-style-type: none">• Cab wiring harness• Platform wiring harness• Chassis wiring• Diagnostics and service ports• Sensors• Joystick and switch wiring• Cabin/dashboard electronics• Switches and actuators | <ul style="list-style-type: none">• Cab and armrest wiring harness• Platform wiring harness• Transmission harness• Engine harness connections• Safety and sensors | <ul style="list-style-type: none">• Fuse and relay distribution• Backup alarm• Auxiliary circuit PDM• Battery connections• Sensors and safety power distribution• Internet of Things (IoT) module power protection• Telematics power protection |
|---|---|---|

Connector Series for Industrial Applications



48V CONNECTORS

Wide selection of 48V connectors for up to 60V with proven terminal systems to avoid intermittent contacts



HV CONNECTORS AUX MODULES

Largest global portfolio of auxiliary module connections, rated up to 1000V and 800A



HV CONNECTORS POWER CONVERSION

Largest global portfolio of power conversion connections, rated up to 1000V and 800A

PRODUCT RANGE

- | | | |
|---|---|--|
| <ul style="list-style-type: none">• LVCS 0.64 and 2.8 Series• CMC 0.64 V0 Series• CTS 1.2 SensoMate® Series• Apex 2.8 Sealed Series• CTS 9.5 Sealed Series• DCS 9.5 Power Sealed/4.8 Series• Mixed CTS 9.5 and Apex 1.2 Series• PowerPack LV 1000 and 2000 Connectors• PowerPack 48V Sealed Ring Connectors | <p>Auxiliary Modules Solutions:</p> <ul style="list-style-type: none">• ShieldPack™ HV630• ShieldPack HV280• ShieldPack HV AK Class 1, 2• Shield Pack HV 280/630 Splice• ShieldPack APEX280• ShieldPack HV HES240 onboard charger (OBC)• PowerPack HV630 OBC• Headers and connectors | <p>Power Conversion Solutions:</p> <ul style="list-style-type: none">• DCT™1400• ShieldPack HV AK Class 4• ShieldPack HV RCS800, 890, 1100, and 1190• PowerPack HV RCS800• ShieldPack HV Metal and Plastic Pass-Throughs |
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FEATURES & BENEFITS

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| <ul style="list-style-type: none">• Industry standard interfaces• Withstand high vibration levels and operating temperatures• IEC creepage and clearance standards up to 60V• Terminal secondary lock eliminates terminal pushout risk• Sealed connectors mitigate risk of electrochemical corrosion | <ul style="list-style-type: none">• Industry standard interfaces• Withstand high vibration levels and operating temperatures• Multiple layouts and high-voltage interlock loop (HVIL) options• Finger-proof, touch-safe designs• Tool-less mating and un-mating systems• Space-saving options• Field-proven designs used across electrification market | <ul style="list-style-type: none">• Industry standard interfaces• Withstand high vibration levels and operating temperatures• Multiple layouts and HVIL options• Finger-proof, touch-safe designs• Tool-less mating and un-mating systems• Innovative Screw Position Assurance• Field-proven designs used across electrification market |
|--|--|---|

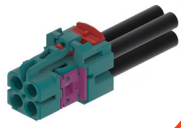
TYPICAL APPLICATIONS

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|---|---|--|
| <ul style="list-style-type: none">• Forklift power distribution• Lighting applications• Traction motor• Slew drive electrification• Sensor and actuator connections• Battery modules | <ul style="list-style-type: none">• Engine auxiliaries: AC compressors, pumps and heaters• DC-to-DC Converter• On-board charger• Battery pack• HV power distribution unit (PDU) | <ul style="list-style-type: none">• HV PDU• Battery connections• Electric motors |
|---|---|--|

Industrial Application Guide

FORKLIFTS AND UTILITY VEHICLES

HIGH SPEED DATA CONNECTORS



- Cameras and antennas
- Smart sensors
- Industrial ethernet
- Infotainment features
- Autonomous systems
- Radar and lidar

CTCS



HES



- Cabin and armrest wiring
- Diagnostics and service ports
- Joystick and switch wiring
- Sensors, hydraulics, control unit, switches and actuators

HV POWER CONVERSION



- Battery connections
- HV PDU
- Electric motors

POWERPACK LV1000



- Fuse and relay distribution
- Auxiliary circuit PDM
- Battery connection
- Power protection

48V



- Motor and drivetrain connections
- Lighting applications
- Pump applications
- Battery connections
- Sensor and actuator connections

OCS



NANOPACK CTS



CMC



CTS 1.2



APEX



- Main, chassis and instrument panel wiring
- Hydraulics
- Actuators and solenoids
- Joystick and pedal controls
- Signal lights
- Sensor wiring

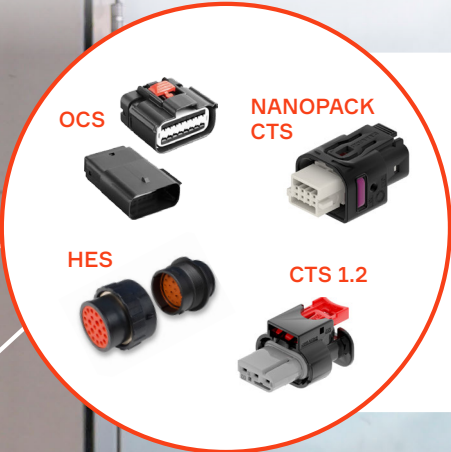
HV AUX MODULES



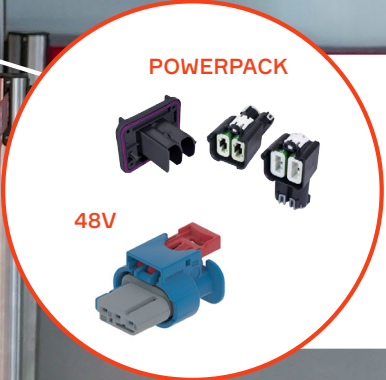
- Engine auxiliaries: A/C compressors, pumps and heaters
- DC-to-DC converter; OBC
- Battery pack; HV PDU

Industrial Application Guide

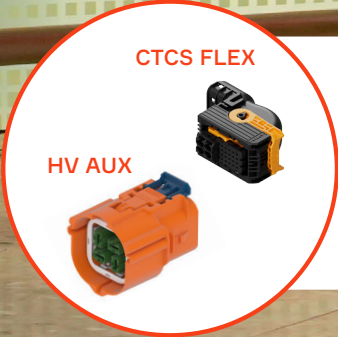
AERIAL VEHICLES



- Main, chassis and instrument panel wiring
- Hydraulics
- Actuators and solenoids
- Joystick controls
- Signal lights
- Sensor wiring
- Switches



- Motor and drivetrain connections
- Lighting applications
- Pump applications
- Battery connections
- Sensor and actuator connections



- Console wiring
- Backup alarm
- Battery connections
- Electric motors
- Power inverters
- Lighting systems



For More Information

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