STANDARD HEADERS
AUTOMOTIVE SELECTION GUIDE

Standard headers for Molex sealed and unsealed connectors
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<tr>
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<th>Current</th>
<th>Circuits max. per Pocket</th>
<th>No. of Pockets per Header</th>
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<th>Terminal Type &amp; Sizes</th>
<th>Operating Temperature</th>
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<th>PC Board Attachment</th>
<th>EMC Filtering Option</th>
<th>Orientation</th>
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<th>Page</th>
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<tr>
<td>CMC</td>
<td>1000V</td>
<td>21.0A</td>
<td>53</td>
<td>3</td>
<td>IP67 IP69</td>
<td>Tabs 2.80mm 1.50mm 0.64mm</td>
<td>105°C</td>
<td>2.54mm</td>
<td>Solder Tail, Press Fit</td>
<td>No</td>
<td>Right Angle</td>
<td>Tin, Gold</td>
<td>4</td>
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<tr>
<td>MX123™</td>
<td>1500V</td>
<td>25.0A</td>
<td>80</td>
<td>1</td>
<td>IP67 IP69</td>
<td>Tabs 2.80mm 0.64mm</td>
<td>125°C</td>
<td>2.54mm</td>
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<td>Tin, Silver, Gold</td>
<td>6</td>
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<tr>
<td>MX150™ Shrouded</td>
<td>500V</td>
<td>15.0A</td>
<td>20</td>
<td>1</td>
<td>IP67 IP69</td>
<td>Tab 1.50mm</td>
<td>125°C</td>
<td>3.50mm</td>
<td>Solder Tail, Press Fit</td>
<td>No</td>
<td>Right Angle</td>
<td>Tin, Silver, Gold</td>
<td>8</td>
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<tr>
<td>MX150™ Breakaway</td>
<td>1500V</td>
<td>16.0A</td>
<td>20</td>
<td>1</td>
<td>IP67 IP69</td>
<td>Tab 1.50mm</td>
<td>125°C</td>
<td>3.50mm</td>
<td>Solder Tail</td>
<td>No</td>
<td>Right Angle</td>
<td>Tin, Gold</td>
<td>10</td>
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<tr>
<td>Stac64™</td>
<td>500V</td>
<td>30.0A</td>
<td>10</td>
<td>4</td>
<td>–</td>
<td>Tabs 2.80mm 1.50mm 0.64mm</td>
<td>105°C</td>
<td>2.54mm</td>
<td>Solder Tail</td>
<td>No</td>
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<td>12</td>
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<tr>
<td>Mini50™</td>
<td>1500V</td>
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The Molex family of CMC Hybrid Connectors provides a sealed, high-density, modular and cost-effective connection system for heavy-duty, powertrain and body-electronic applications in the transportation industry.

The CMC connector family from Molex is a sealed, high-density connection system developed for the transportation industry. It is designed to perform in high-conductivity applications and in harsh environments. CMC connection systems are used in power train applications including engine-control units (ECU's), compartment applications, gearboxes, electronic parking brakes and suspension controllers, together with body electronics applications in automotive and commercial vehicles.

Standard CMC hybrid connectors hold two different terminal sizes, CP 0.635 and CP 1.50mm. Power CMC hybrid connectors hold three different terminal sizes, CP 0.635, CP 1.50 and CP 2.80mm.

**Features and Benefits**

- **High-performance sealed-connection system using matte-seal technology for CP 0.635 and 1.50mm terminals and using single-wire seal technology for CP 2.80mm terminals**
- Performs in sealed applications where IP69K rating and 500mbar water-tightness are required
- **Hybrid-connection system using three different terminal sizes; CP 0.635, CP 1.50 and CP 2.80mm terminals**
- Supports low-, medium- and high-current applications from 2.5 up to 21.0A to perform in harsh-environments and high-conductivity applications
- **High-density system due to compact-connector design and fine-pitch size of 2.54mm**
- Requires reduced space on customers printed circuit board (PCB) or customers engine compartment
- **Modular-connector system with a wide variety of circuit sizes (22 to 53)**
- Cost effective system; uses same connector type for different harness size needs
- **System offers several color codings and mechanical polarization**
- Reduces cycle time during harness assembly due to easy visual installation and avoids mis-mating of the headers and connectors
- **Unused cavities can be void Terminal cavities 0.60, 1.50 and 2.80 a blind plug option is available to close cavities guaranteeing IP67K and IP69K sealing**
- Provides flexibility, increases efficiency and reduces cost
- **Wide range of standard headers and standardized cut-out header shapes**
- Standard headers provide competitive pricing and time saving solutions Provides major cost savings for custom designs Off the shelf designs available
- **CP female terminals, offered in tin or gold, work with a variety of wire sizes**
- Provide superb technical solutions for harsh environments

**Applications**

- **Automotive**
  - Automotive vehicles
  - Body electronics
  - Engine control unit
  - Gearbox
  - Powertrain
  - Suspension controller
- **Transportation**
  - Electric doors
  - Junction/fuse box
  - Lighting control system
  - Motorcycles

**Ordering Information**

<table>
<thead>
<tr>
<th>Header</th>
<th>Interfaces</th>
<th>32 Circuits</th>
<th>36 Circuits or 48 Circuits</th>
<th>48 Circuits or 48 Circuits</th>
<th>53 Circuits</th>
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<tbody>
<tr>
<td>CP 0.64mm (pcs)</td>
<td>24</td>
<td>30 / 40</td>
<td>40</td>
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<tr>
<td>CP 1.50mm (pcs)</td>
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<td>6 / 8</td>
<td>8 / 8</td>
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<tr>
<td>CP 2.80mm (pcs)</td>
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<td>-</td>
<td>-</td>
<td>5</td>
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**Applications**

<table>
<thead>
<tr>
<th>Header</th>
<th>Interfaces</th>
<th>72 Circuits (36+36) or 96 Circuits (48+48)</th>
<th>80 Circuits (48+32)</th>
<th>112 Circuits (32+48+32)</th>
<th>154 Circuits (48+53+53)</th>
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<tbody>
<tr>
<td>CP 0.64mm (pcs)</td>
<td>60 / 80</td>
<td>64</td>
<td>88</td>
<td>120</td>
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<tr>
<td>CP 1.50mm (pcs)</td>
<td>12 / 16</td>
<td>16</td>
<td>24</td>
<td>24</td>
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<td>CP 2.80mm (pcs)</td>
<td>-</td>
<td>-</td>
<td>10</td>
<td>-</td>
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</table>

**Specifications**

**ELECTRICAL**

- **Voltage:** 500V max. Current: 0.64mm – 2.5A max. 1.50mm – 12.0A max. 2.80mm – 21.0A max.
- **Dielectric Withstanding Voltage:** 1000V AC for 1 minute

**PHYSICAL**

- **Header Housings:** PBT Glass-filled
  - Contacts: Copper Alloy, Lead free
  - Operating Temperature: -40 to +105°C

**Mechanical**

- Durability: 20 mating cycles
Molex has developed a fully-sealed, high-performance MX123 connection system that offers the smallest packaging size in the industry, designed for transportation power-train applications that accommodate low-level signal and high-current load requirements.

The MX123 is a fully sealed, high-performance connection system that has been optimized for transportation power-train applications in the most challenging under-hood environments. MX123 connection systems are currently used in on-engine automotive applications, off-road construction and industrial equipment. The MX123 system maintains low and stable contact resistance under severe temperatures and vibrations.

The header pins are protected from scooping by a center wall that extends longer than the terminal length. This innovative connection system is based on two terminal systems, 064- and 280-size terminals, to provide optimal electrical performance. The 064-size terminal system has increased normal force and selective precious plating required to maintain performance characteristics in the most demanding environments.

The MX123 vertical headers mate with the MX123 lever receptacles. The headers have been designed to provide customer flexibility by offering two mounting style options, three PCB electrical strategies and multiple-plating options. The headers are designed to be vertically mounted from the top or bottom of a casting. They are available for through-hole solder processing, compliant-pin, or wire-bonding technologies with precious plating (Gold or Silver).

Features and Benefits

- Header and receptacle housings with 6 unique mechanical polarization options and unique color coding
- Wire dress for lever receptacles available in 0 and 180°orientation
- Anti-scooping features friendly to “blind-mate” conditions
- Optional header terminal filtering eliminates cross talk between adjacent circuits
- PCB tail customization available with solder-tail or compliant-pin technology
- Header placement flexibility allows top or bottom header loading to streamline module manufacturing process’s
- Precious plating enables stable contact resistance under extreme temperature and vibration conditions
- Receptacle connector available with pin deletes (knock out patterns)

Applications

- **Automotive**
  - Automotive vehicles
  - Body electronics
  - Engine control unit
  - Gear box
  - Powertrain
  - Suspension controller
- **Transportation**
  - Electric doors
  - Junction/fuse box
  - Lighting control system
  - Motorcycles

Specifications

**REFERENCE INFORMATION**

Packaging: Tray

**ELECTRICAL**

Voltage (max.): 500V

Current (max.):
- 2.80mm — 25.0A
- 0.64mm — 11.0A

Contact Resistance:
- 2.80mm — 5 milliohms max.
- 0.64mm — 20 milliohms max.

Dielectric Withstanding Voltage: 1500V AC

Isolation Resistance: 20 Megohms min.

**MECHANICAL / ELECTRICAL / SEALING**

Mating Force: Less than 75N

Unmating Force: Less than 75N

Connector Retention (Primary Latch): 110N min.

Polarization Feature Effectiveness: 220N min.

Durability - 10 Cycles:
- 2.80mm - 5 milliohms max.
- 0.64mm - 20 milliohms max.

Mechanical Shock and Vibration Sequence (GMW3191, Electrical):
- 2.80mm - 5 milliohms max.
- 0.64mm - 20 milliohms max.

Sealing Class: IP67K and IP69K

**PHYSICAL**

Housing: 30% Glass Filled PBT

Contact: Copper (Cu) Alloy

Terminal Plating:
- 2.80mm — Tin (Sn)
- 0.64mm — Gold (Au) or Silver (Ag)

Underplating:
- 2.80mm — Nickel (Ni)
- 0.64mm — Nickel (Ni)

Operating Temperature: -40 to +125 °C

Ordering Information

<table>
<thead>
<tr>
<th>Header</th>
<th>56 Circuits</th>
<th>66 Circuits</th>
<th>73 Circuits</th>
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<td>56</td>
<td>64</td>
<td>72</td>
<td>80</td>
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<td>2.80mm</td>
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<td>Key G, H</td>
<td>Key A, C</td>
<td>Key A, B, C</td>
<td>Key G, H</td>
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<td>Black, Blue</td>
<td>Black, Gray, Blue</td>
<td>Blue, Gray</td>
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<td>Mates With Port</td>
<td>34576</td>
<td>34823</td>
<td>34566</td>
<td>34566</td>
</tr>
</tbody>
</table>

Features and Benefits

- Offers the ability to use multiple connectors on one module without the risk of cross-mating incorrect harness connectors
- Allows for wire-routing design flexibility
- Friendly to “blind-mate” conditions
- Eliminates cross talk between adjacent circuits
- Allows for PCB design flexibility
- Allows top or bottom header loading to streamline module manufacturing process’s
- Enables stable contact resistance under extreme temperature and vibration conditions
- Allow for harness customization

Wire dress for lever receptacles available in 0 and 180°orientation

Worldwide Order Center

www.molex.com/ind/mx123.html
Submersible MX150 single- and dual-row headers offer superior sealing and electrical performance to simplify direct wire-to-board connections in high-temperature, under-hood and on-chassis transportation environments.

The MX150 sealed headers are being developed to meet the demand for rugged, environmentally sealed, connector systems for use in high-temperature automotive and other transportation applications. Molex’s sealing interface has been optimized to meet IP67K and IP69K sealing requirements. Designed for under-hood and on-chassis vehicle environments, the MX150 sealed headers complement the widely used and industry-recognized MX150 female receptacle connectors.

MX150 sealed headers are designed to be attached with adhesives to an aluminum casting or molded plastic module housing to offer increased sealing capability for the most demanding environments. Today Molex offers a complete line of wire-to-wire connection systems in single- and dual-row configurations. For wire-to-board applications, customers have been required to tool the USCAR-specified interface directly into the device for which they are responsible. MX150 headers will simplify customer device tooling by incorporating the interface geometry directly into the sealed headers. Customers will no longer need to maintain the stringent USCAR dimensional requirements in tooling to meet USCAR footprint requirements.

**Features and Benefits**

| High-temperature thermoplastic housing | WITHSTANDS WAVE SOLDERING PROCESSING PLUS TIN/LEAD IR-REFLOW SOLDERING |
| Solder-tail and compliant-pin electrical interfaces | PROVIDE MODULE DESIGN FLEXIBILITY |
| Header retention design | PROTECTS ADHESIVE Joints DURING CONNECTOR MATING AND UNMATING |
| Sealing geometry | INCORPORATES A SPRAY SHIELD NECESSARY TO MEET IP67K AND IP69K SEALING PERFORMANCE REQUIREMENTS |
| Board alignment and retention features | SIMPLIFY HEADER PCB PLACEMENT AND RETAIN HEADER TO PCB DURING SOLDERING OPERATION(S) |

**Applications**

- Automotive Vehicles
- Commercial Vehicles
- Recreational Vehicles
- Industrial Vehicles and Equipment
- Construction Equipment
- Marine Equipment
- Industrial Customer - Control Modules
  - Radios
  - Pumps
  - Sensors

**Specifications**

**REFERENCE INFORMATION**

3.50mm Pitch

<table>
<thead>
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<th>MATES WITH:</th>
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<tr>
<td>SERIES 33471 AND 33472 FEMALE CONNECTORS</td>
</tr>
</tbody>
</table>

**ELECTRICAL**

Maximum Steady State Current Rating 1.50mm: 15.0A

Dielectric Withstanding Voltage: 500V DC

Isolation Resistance: 20 Megohms min.

**MECHANICAL**

Durability: 10 mating cycles

Header Blade Retention Force: 50N

**PHYSICAL**

Header Housings: high temp plastic resin

Contact: Copper Alloy

Solder ability: Wave or Reflow compatible

Operating Temperature: -40 to +125°C

**Ordering Information**

Please contact Molex for further information!

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Header (2 Circuits</th>
<th>3 Circuits</th>
<th>4 Circuits</th>
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<table>
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</table>

| Configuration | Header (1.50mm | 2 x 2 | 2 x 3 | 2 x 4 |
| --- | --- | --- | --- |
| Color Codings | Pol A, B, C, D |
Flexible design permits customers to standardize PCB layouts and reduce inventory carrying costs.

MX150, unshrouded headers are designed to mate with Molex MX150 connectors and are compatible with USCAR standard connectors. The unshrouded headers allow customers to standardize printed circuit board (PCB) designs by incorporating the shroud into an external shell, permitting rapid-design revisions while reducing work in process.

The unique breakaway design allows the customer to meet the increasing demands for design flexibility. These low-profile vertical headers are available in both single and dual-row configurations. A wide range of circuit sizes, plating options and pin lengths are available. The MX150 unshrouded breakaway headers are appropriate for both power and signal applications with current ratings up to 16 amperes per circuit.

### Features and Benefits

- High-temperature thermoplastic housing
- Assures lead-free processing compatibility
- Unshrouded design
- Offers flexibility in customer application
- Designed to be compatible with Molex MX150 connectors
- Accommodates wire-to-board applications
- Compatible with USCAR 1.50mm blade specifications
- Industry compatible format
- Unique breakaway design
- Provides ability to break between rows and circuits
- 20-Circuit master sticks
- Provide distributor-friendly, value-added opportunities

### Applications

- **Outdoor applications**
  - Telecommunications devices
  - Lighting
  - Audio
- **Automotive related markets**
  - Automotive suppliers
  - Trucking industry
  - Specialty vehicle manufacturers
  - Automotive aftermarket and specialty equipment manufacturers
- **Recreational Markets**
  - Outdoor power equipment
  - Recreational vehicles
  - Snowmobiles
  - Motorcycles
  - ATV’s
- **Indoor sealed applications**
  - Appliances
  - Restaurant equipment makers
  - Utility equipment manufacturers

### Specifications

#### Mechanical
- Contact Retention to Housing: 6.8N
- Mating Force: 6.5N per contact max.
- Unmating Force: 5N per contact max.
- Durability:
  - Tin (Sn) — 25 cycles
  - Gold (Au) — 50 cycles

#### Physical
- Housing: LCP
- Contact: Copper (Cu) Alloy
- Plating:
  - Contact Area — Tin (Sn) or Gold (Au)
- Solder Tail Area —
  - Tin (Sn) 1.5μm or 2.5μm
  - Underplating — Nickel (Ni)

#### Ordering Information

**75757** Vertical Unshrouded Breakaway 
**75900** Right Angle Unshrouded Breakaway
Stackable connection system provides single and multi-pocket PCB solutions, offering a diverse range of circuit sizes and greatly reducing time-to-market by completely eliminating custom tooling; new female connectors feature the only finger-actuated design in the industry.

To address the growing electronic device requirements within today’s vehicles, Molex has developed a modular 0.64, 1.50 and 2.80mm (.025, .059 and .110") terminal header system. The Stac64 connection system allows OEM and device manufacturers greater design flexibility to support both low-level signal requirements as well as power applications upwards of 30.0A. The Stac64 system allows automotive manufacturers to use header assemblies as stand-alone components, to gang multiple headers together to support a large range of signal and power needs for devices and modules.

This Stac64 is a standard product system based on USCAR-2 Class II mechanical and electrical performance characteristics for unsealed connector applications. The connectors mate to existing wire-harness connectors designed to the USCAR/EWCAP industry footprints.

### Features and Benefits

- **Stackable connection system of readily available PCB headers**
  - Reduced time-to-market: engineering and validation times reduced significantly
  - No tooling necessary to produce custom multi-bay headers

- **The header and female receptacle housings are molded in standard USCAR color schemes**
  - The color coding offers visual polarization and aids in connection system assembly

- **Pre-assembled TPA to receptacle housing shipped as single assembly**
  - Applied labor and cost savings

- **Modular-housing design with standard dovetail features molded into the housings**
  - Allows headers to be ganged together in large assemblies to meet growing terminal quantity requirements

- **PCB alignment posts**
  - Ensure all terminals are properly aligned into PCB through-holes during assembly
  - Retain header to PCB during assembly and solder processing

- **PCB stand-offs molded into housings**
  - Provide additional trace-routing real estate under the headers

- **Female receptacle TPA retention features**
  - Greatly reduce the possibility of seating TPA’s during transit and handling.

### Specifications

**REFERENCE INFORMATION**

**Packaging:** Tray or Tube

**Mates With:**
- Series 34729 and 31372 female connectors

**Designed in:** Millimeters

**ELECTRICAL**

- **Voltage:** 500V max.
  - Current:
    - 0.64mm – 10.0A max.
    - 1.50mm – 20.0A max.
    - 2.80mm – 30.0A max.

**MECHANICAL**

- **Durability:**
  - 10 million cycles
  - 20 mating cycles

- **Header Pin Retention Force:** 10 mating cycles

- **Isolation Resistance:** 500V DC

- **Dielectric Withstanding Voltage:** 500V DC

- **Contact:** Copper Alloy

- **Header Housings:** Glass filled SPS

### Ordering Information

#### Single-Bay

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<tbody>
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<td><strong>Type</strong></td>
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<td>34696*.<em>20</em></td>
<td>34697*.<em>24</em></td>
<td>34698*.<em>28</em></td>
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<tr>
<td><strong>Configuration</strong></td>
<td>1 = Vertical</td>
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<td>1 = Vertical</td>
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<td>12 circuits</td>
<td>16 circuits</td>
<td>20 circuits</td>
<td>34 circuits</td>
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<tr>
<td><strong>Contact</strong></td>
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<td>-40 to +105°C</td>
<td>-40 to +105°C</td>
<td>-40 to +105°C</td>
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#### Ganged Multi-Bay

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<td>Housing and Pin Assembly</td>
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<td>34707-3***</td>
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<td>Housing and Pin Assembly</td>
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<tr>
<td>34707-4***</td>
<td>4</td>
<td>Vertical</td>
<td>Housing and Pin Assembly</td>
</tr>
</tbody>
</table>

www.molex.com/link/stac64.html
Achieve 50% space savings over traditional USCAR 0.64mm connectors with Molex’s unsealed miniature Mini50™ connection system, with smaller terminals to fit more low-current electrical circuits in interior, unsealed, transportation-vehicle environments.

The Mini50 unsealed, wire-to-board connection system offers customers reduced package sizes compared to conventional 0.64mm connection systems, with applied cost savings and enhanced reliability.

Mini50 SMT headers are being developed to allow customers to maximize valuable PCB area by removing pass-through features on the circuit board. Module and PCB designers will be able to locate surface mount components beneath the Mini50 headers on the opposite side of the printed circuit board. The headers will be designed to mate to the existing, industry-recognized Mini50 receptacles.

Features and Benefits

Reduced package sizes
Approximately 50% smaller than USCAR 0.64mm unsealed interfaces

Orientation features are molded into the header
Either vertical or right-angle orientations are possible, providing wire-routing and module-design flexibility

Board alignment and retention features
Simplify header PCB placement and retain header to PCB during soldering operation(s)

High-temperature thermoplastic housings
Withstand infrared (IR) and wave lead-free solder processing per ES-40000-5013 Molex specification, maximum temperature +260°C

Female terminal wire grips for wires 0.35mm² and smaller
Wire-size reduction; weight, space and cost savings versus 0.64mm interfaces

Three polarization options
Three discrete mechanical, visual, and colored polarizations

Applications

• Automotive and Transportation
  - Headliners
  - Clusters / Navigation
  - Radios
  - Cameras / Sensors
  - HVAC
  - Switches
  - Lighting
  - Mirrors
  - Steering Wheel Column

Specifications

REFERENCE INFORMATION
Pitch - Mating Interface 2.00mm
Packaging: Tray or tube
Mates with:
  - Single-row receptacles Series: 34791
  - Dual-row receptacles Series: Preliminary

Designed in: Millimeters

ELECTRICAL
Voltage (max.): 500V
Current (max.): 3.0A
Contact Resistance:
  - 20 milliohms max.
Dielectric Withstanding Voltage:
  - 1500V AC min.
Isolation Resistance:
  - 100 Megohms min.

MECHANICAL
Durability: 20 milliohms max.
  - Tin (Sn) Plating – 10Cycles
Pin Retention: 15N min.

PHYSICAL
High Temperature Thermoplastic
Contact: C260 Brass
Plating:
  - Contact Area — Tin (Sn)
Underplating — Nickel (Ni)
Operating Temperature:
  - -40 to +105°C

Ordering Information

Single-Row

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By Product Name
This keyword search allows you to link to the commercially used name for a connector family or category, such as MX150™ or CMC.

By Part Number
Enter an entire or partial Molex part number to get the search results. Or search by competitor part number to find the Molex equivalent.

Ganged Multi-Bay
3 4 7 0 X 0 X
Orientation
7 = Vertical
2 = Right Angle
0 = 2-Bay
X = 4-Bay

Configuration Code
Build-a-Part-Number (allows for creation of unique engineering numbers if an order number doesn’t already exist)
Get customized insights at: molex.com/industry/automotive.html