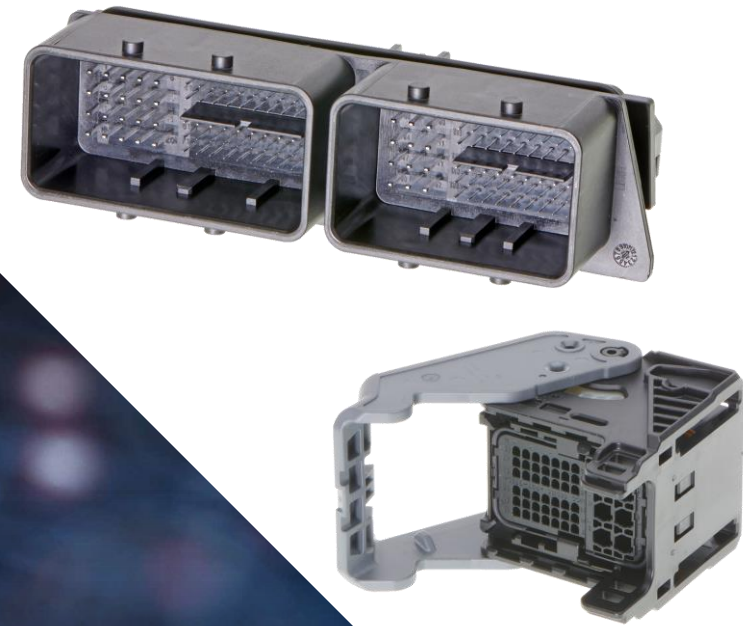


COMPACTUS SEALED HYBRID CONNECTOR SYSTEM

NPI INNOVATION

MAY 2023



creating connections for life

molex

COMPACTUS SEALED HYBRID CONNECTOR SYSTEM

Compactus Sealed Hybrid Connectors are robust, high-density, automotive-grade connectors that permit manufacturers to fit more power and signal transmission ability into a small space.

Key Product Information

Category: Wire-to-Board Connectors
Header Circuits: 128, 146, 186
Receptacle Circuits: 48, 66, 72, 80, 114
Terminal Sizes: 0.50, 1.00, 2.80mm



[View Product Landing Page](#)

[Download Datasheet](#)

Series

560132	Header, 128-Way
560134	Header, 146-Way
560138	Header, 186-Way
560151	Receptacle, 48-Way
560152	Receptacle, 66-Way
560153	Receptacle, 72-Way
560154	Receptacle, 80-Way
560155	Receptacle, 114-Way
560121	CTX-J50 Receptacle Terminal
560205	CTX-J100 Receptacle Terminal
560122	CTX-J280 Receptacle Terminal
560144	Dummy Plug for CTX-J50
503131	Dummy Plug for CTX-J100
560145	Dummy Plug for CTX-J280
560189	Wire Dress Cover, Short
560190	Wire Dress Cover, Medium
560191	Wire Dress Cover, Long

VITAL PRODUCT INFORMATION



What makes this product different from the competition?

Compactus Sealed Hybrid Connectors provide a high-density connection system utilizing 0.50mm terminals and offering a 20% space saving compared with 0.64mm terminals.

How does this product/solution create value for our customers?

The Compactus system features versatile, high-density, sealed connectors with three terminals sizes (0.50, 1.00 and 2.80mm), enabling it to carry low, medium and high current.

Three header circuit counts (128-way, 146-way and 186-way) offer various combinations and design flexibility.

Selectable wire dress covers come in short and long.

Left and right flexible cable outlet directions are available, offering designed-in flexibility for the customer for mounting in very dense environments.

Heat resistance, sealing property and vibration resistance enable Compactus connectors to achieve high performance within the harsh engine compartment environment.

PRODUCT OVERVIEW

Robust, dependable, IP69K-rated sealed connections for high-vibration applications in automotive engine spaces and other harsh environments

The Compactus system combines excellent electrical performance, rugged reliability and advancements in miniaturization to provide a space-saving and flexible connection solution suited to a variety of applications.

Broad design flexibility—one versatile connector

Headers are available with 128, 146 and 186 circuits, and receptacles are available with 48, 66, 72, 80 and 114 circuits, offering a range of system design options while retaining a common connector.

Terminal design optimized for high-density, space-constrained applications

Designed for modern automotive and other applications requiring rugged, sealed connectors, the Compactus system optimizes limited space with compact 0.50mm terminals that can use up to 20% less interface space than older 0.64mm designs.



MARKETS AND APPLICATIONS



Automotive

- Engine control unit (ECU) modules
- Motor control unit (MCU) modules
- Chassis control unit modules
- Battery packs
- Transmission controllers
- Suspension controllers
- Electronically controlled parking brakes
- Hybrid electric vehicle (HEV) and electric vehicle (EV) inverters
- Body electronics
- Illumination control systems
- Junction/fuse boxes
- Automatic doors



Commercial Vehicle

- Vehicle control unit (VCU) modules
- Door control unit (DCU) modules
- Construction/agriculture machinery
- Motorcycles

FREQUENTLY ASKED QUESTIONS

What is the test standard used for Compactus connectors?

Japan OEM standard

What is the reason for the development of the Compactus system?

Originally developed for Japanese manufacturers, Compactus is gaining in popularity with customers in many different regions as a highly compact and ruggedized ECU connector with a smaller footprint and package size versus traditional ECU connectors. While not USCAR certified, Compactus has been tested to equally stringent Japanese OEM testing standards and is a rugged and robust solution for customers looking to save space without sacrificing performance and reliability.

What are the key markets for Compactus?

Compactus is well established in the Japanese market and has started to be adopted in the Chinese OEM market, including in Zonal electronic control unit (ECU) and battery pack applications. Compactus has not been adopted widely in the US or Europe yet, but is an ideal product when customers are looking for a smaller, robust I/O ECU connector.

SOLVING INDUSTRY CHALLENGES

Industry Need	Industry Challenge	Industry Solution	Anticipated Results
Compactness	To meet market demands for more functions and connectivity, automotive and commercial vehicle manufacturers need to fit a wide range of electronic components into ever-shrinking spaces.	In response, Molex has designed Compactus Sealed Hybrid Connectors. This connector system delivers higher circuit density in a compact housing.	Automotive and commercial vehicle manufacturers can fit more power and signal transmission ability into a small space, easing growing space constraints as more functions are designed into vehicles.
Size options	One size does not fit all. Often a connector product line offers very limited size options or none at all. Having to purchase different connector lines can complicate procurement processes.	The Compactus Sealed Hybrid Connector product line includes three different circuit-size headers, offering flexibility for a range of application designs.	Multiple header sizes mean this connector family can be purchased for a variety of applications, simplifying procurement processes and potentially shortening design time and time to market.
Terminal options	Different applications need varying currents and data rates. As a result, transportation customers often require wire size options.	Compactus Sealed Hybrid Connectors offer three terminal options in one connector: 0.50, 1.00 and 2.80mm.	Engineers won't necessarily have to shop for a new connector family when an application requires a different wire gauge.
Harness assembly flexibility	Automotive and commercial vehicle engineers need design flexibility to route wires within engine compartment configurations.	Compactus Sealed Hybrid Connectors provide both left and right wire exits as well as long and short wire dress covers, delivering flexibility in how wires can be routed in tight locations.	Engineers will have an easier time routing wires within the tight real estate available in engine compartments. This, in turn, will shorten design time.

PRODUCT FEATURES AND ADVANTAGES

0.50mm terminal system

Can reduce the interface area by 20% compared with conventional 0.64mm products

Three terminal sizes available in one connector (0.50, 1.00 and 2.80mm)

Enables more efficient transmission of low, medium and high current

Three header sizes (128, 146 and 186 circuits) and five receptacle sizes (48, 66, 72, 80 and 114 circuits) are available

Offering various combinations in modularity and design flexibility



Key Specifications	
Number of Circuits	128 to 186 (header) 48 to 114 (receptacle)
Terminal Size	0.50, 1.00, 2.80mm
Wire Size	0.30 to 2.50mm ²
Sealing	IP69K-rated grommet seal
Locking	Pre-lock Independent Secondary Lock (ISL)
Operating Temperature	-40 to +120°C

PRODUCT FEATURES AND ADVANTAGES (CONT'D)

Heat resistance, sealing property and vibration resistance

Achieves high performance within the harsh engine environment

Designed for thin wires

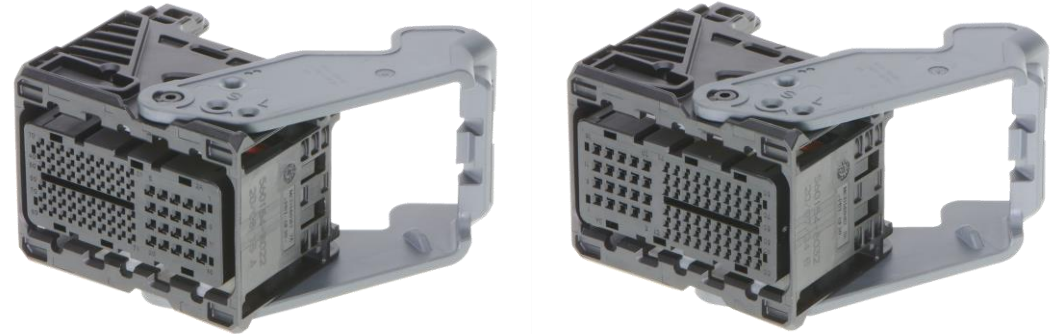
Aids weight reduction, which, in turn, can help lower emissions

Left and right flexible cable outlet directions

Provide designed-in flexibility for mounting into the very dense engine space

Short and long wire dress cover options

Permit closer clearances and improved real estate optimization in space-constrained applications



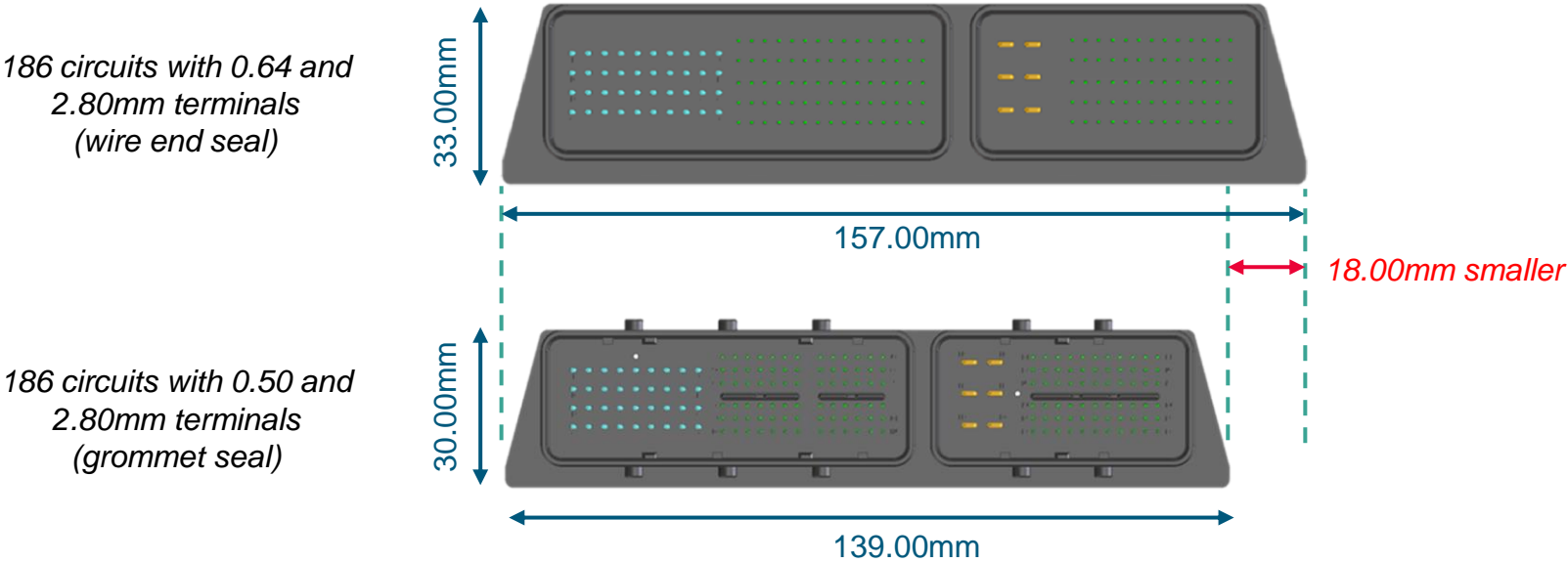
0.50mm terminal side and 1.00mm terminal side flexible cable outlets



Short and long wire dress cover options









ADDITIONAL PRODUCT FEATURES

Header connector size comparison: 0.50 vs. 0.64mm



ADDITIONAL PRODUCT FEATURES (CONT'D)

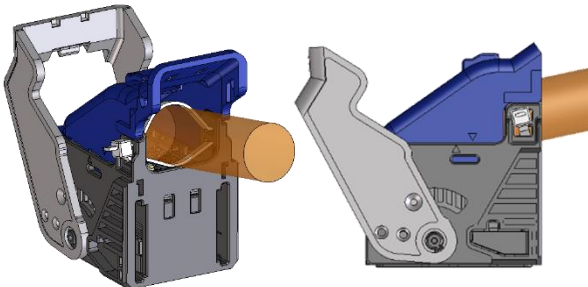
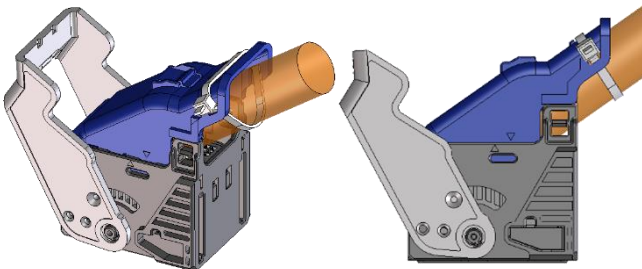
Three header sizes (128, 146 and 186 circuits) and five receptacle sizes (48, 66, 72, 80 and 114 circuits)

Header and Receptacle Combinations			Receptacle				
			48-circuit	66-circuit	72-circuit	80-circuit	114-circuit
							
			0.50mm: 42-circuit 2.80mm: 6-circuit	0.50mm: 54-circuit 1.00mm: 12-circuit	0.50mm: 66-circuit 2.80mm: 6-circuit	0.50mm: 60-circuit 1.00mm: 20-circuit	0.50mm: 78-circuit 1.00mm: 36-circuit
Header	128-circuit		✓			✓	
	146-circuit			✓		✓	
	186-circuit				✓		✓

ADDITIONAL PRODUCT FEATURES (CONT'D)

Wire dress cover options: long and short

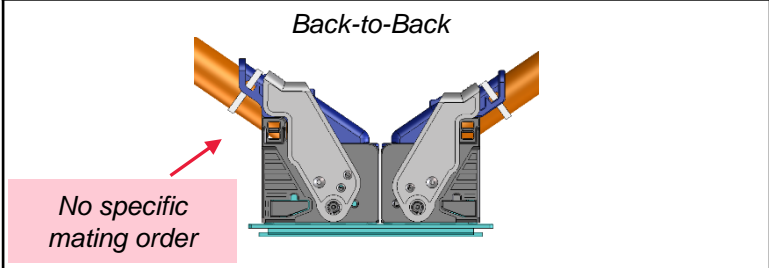
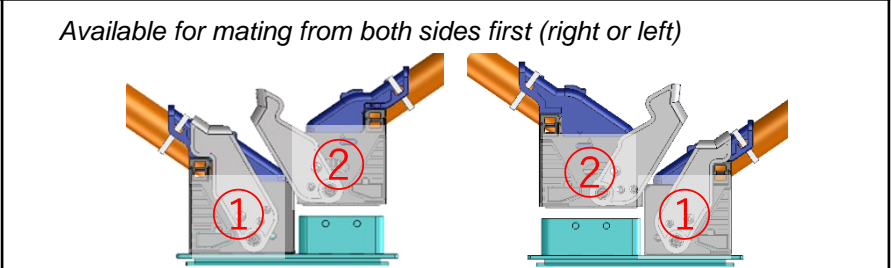
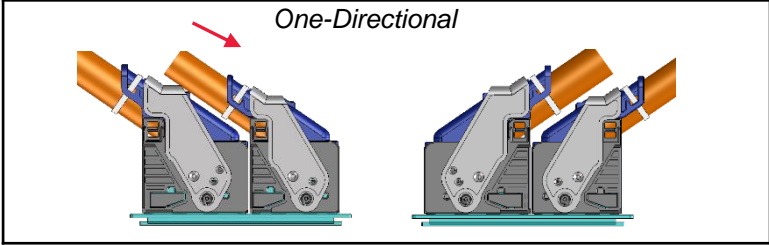
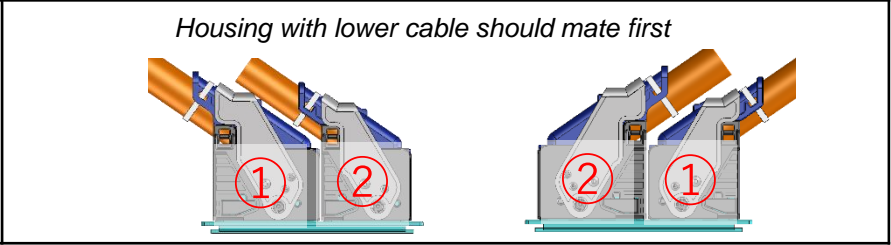
Item	Short	Long
Dress Cover		

Item	Binding to Connector	Binding to Dress Cover
Binding	<div><p>Bind outer housing and harness with tie wrap</p></div>	<div><p>Bind harness and dress cover with tie wrap</p></div>

ADDITIONAL PRODUCT FEATURES (CONT'D)

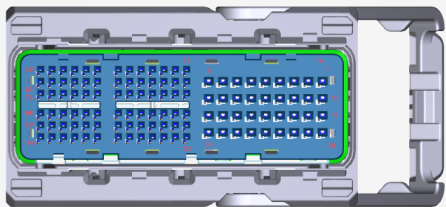
Flexible cable outlet direction: left or right

Direction of Harness: Available for mating back-to-back, one-directional for all housing combinations.
No specific mating order for combinations, and flexible cable outlet direction for vehicle wire harness.

Direction for Wire Harness	Mating Order
<p><i>Back-to-Back</i></p>  <p><i>No specific mating order</i></p>	<p><i>Available for mating from both sides first (right or left)</i></p> 
<p><i>One-Directional</i></p> 	<p><i>Housing with lower cable should mate first</i></p> 

UNIQUE AND USEFUL DIFFERENTIATION VS. SIMILAR MOLEX PRODUCTS

	Product and Technical Differences		
Attributes	Compactus Connectors	CMX Connectors	CMC Connectors
Rows	6	5	4
Maximum Circuit Size (Receptacle)	114 circuits	65 circuits	53 circuits
Terminal Size	0.50, 1.00, 2.80mm	0.64, 1.50mm	0.64, 1.50, 2.80mm
Insertion Force	Low (with slider)	Medium	Medium
Ring Seal Protector	With (100% guard)	With	Without
Secondary Lock	Pre-lock ISL	Front TPA	Side ISL
Sealing	Grommet seal	Grommet seal	Gel



Compactus (114-circuit)



Left to Right: Compactus (66-circuit), CMX (65-circuit), CMC (32-circuit)

SPECIFICATIONS AND SUPPORTING INFORMATION

Reference Information

Packaging: Tray
Header: Waterproof wire-to-board connector
128, 146 or 186 circuits (two blocks)
Female Connector:
Housing – 48, 66, 72, 80 or 114 circuits
Terminal – 0.50mm (signal), 1.00mm
(medium power) or 2.80mm (power)
Seal plug
Dress cover (short or long)
Wire Size:
0.50mm – 0.30 to 0.50mm²
1.00mm – 0.50 to 1.25mm²
2.80mm – 2.00 to 2.50mm²
Mating Requirement: Keyed pair
Designed in: Millimeters
RoHS: Yes

Mechanical

Terminal Retention Force with Independent
Secondary Lock (ISL):
Signal (0.50mm) – 100N (min.)
Power (1.00 and 2.80mm) – 100N (min.)
Mating Force (max.): 70N (lever operation)
Unmating Force (max.): 70N (lever operation)

Electrical

Voltage (max.): 250V
Current (max.): Refer to derating curve
Insulation Resistance: 100 Megohms (min.)

Physical

Housing: Polybutylene terephthalate (PBT)
Housing Color: Black
Contact: Tin
Operating Temperature: -40 to +120°C
Vibration Environment:
Acceleration Rate – 9G (88m/sec²)
Frequency – 20 to 200 Hz
Sealing Performance:
Initial – 50kPa (min.)
After Endurance Test – 30kPa (min.)
High-Pressure Washing Test – IP69K

Additional Resources

Web Overview Page	www.molex.com
Datasheet	987652-5881.pdf (molex.com)
Global Product Manager	Sarah Li, TSBU, TIS



THANK YOU

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