TECH BRIEF

BODY CONTROL MODULE (BCM) CONNECTORS

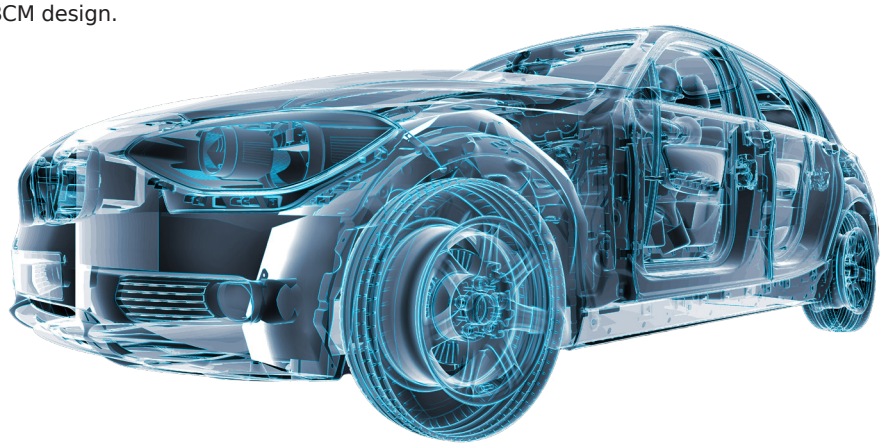
molex

A BCM is one of the most important controllers in a vehicle, as this module manages a wide variety of other functional modules such as windshield wipers, lights, door locks, windows, switches, etc. Recent trends in the automotive industry show increasingly more complex features for vehicle intelligence, electric vehicle internet connection and autonomous driving. The addition of separate electronic modules boosts both the cost and the fault rate of electronic parts and components, making wiring much more complicated. Driven by new-generation E/E architecture, BCM components are integrating more control nodes and moving toward body-domain controllers.

The Integration of BCMs Also Means New Demands for the Connectors They Utilize

First, the number of communication and connection channels between BCM and other modules is increasing rapidly. A majority of BCMs in today's market need approximately 100 pins, while some high-configuration vehicle models require more than 200 pins for the BCM. As a result, there is a demand for more pins on the connectors. The BCM, however, is located beneath the dashboard, which already accommodates many elements, so the restriction of space requires the connector to be as low and narrow as possible. Second, the number of actuators driven by BCMs also is increasing, requiring connectors to provide more wide blade terminals that ensure more large-current input and output. The connector also needs to meet ergonomic requirements for its operation. For example, neither the insertion force nor the withdrawal force should exceed 75N.

Molex pays close attention to industry trends by listening to the voices of its customers on a long-term basis, and has launched the stAK50h connector series that is dedicated to BCM systems based on previous successful cooperation with numerous OEMs and tier-one suppliers. This helps resolve various challenges and issues throughout the BCM design.



Communications With All ECUs and Sensors, Control Over All Actuators

A typical BCM connector normally has the following functional specifications:

- Sensor signal, CAN/LIN, electric current less than 100.0mA, 50 to 70 pins
- Stepping motor, lighting and antenna, electric current less than 3.0A, 30 to 50 pins
- Power supply, ground and electric current, 10.0 to 20.0A, 15 to 25 pins

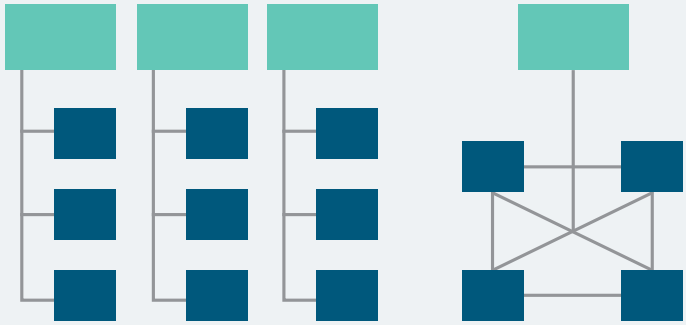
The BCM connector, therefore, requires mixed pins that provide different current-carrying capabilities.

Integrated Modules With Increased Functional Specifications

The level of integration for the BCM will continue to increase, providing the following advantages:

- Reduced controller cost
- Lower fault rate
- Shortened software development cycle
- Ease of wiring

The amount of connector pins will increase to around 200 accordingly.



Distributed E/E Architecture >2020

Centralized E/E Architecture >202?

Restricted BCM-Mounting Space Trends Toward Module Miniaturization

The BCM is often mounted beneath the dashboard or around a pillar, where a wide variety of elements are accommodated and the space is narrow. As a result, the connector needs to have the following features:

- Small footprint
- Height no more than 30.00mm; width as narrow as possible

Simplified Harness Wiring Facilitates Installation Operation

The mounting position and direction for the BCM vary by specific vehicle model. The following requirements are necessary to simplify the harness arrangement:

- IP42 protection, requirement that the connector not be mounted on the top of the module
- Zoned management needed as the BCM connects to the main harnesses
- Ease of installation and mating/unmating of the connector

Support for Ethernet Scalability

The Ethernet provides these advantages as a new-generation communication protocol:

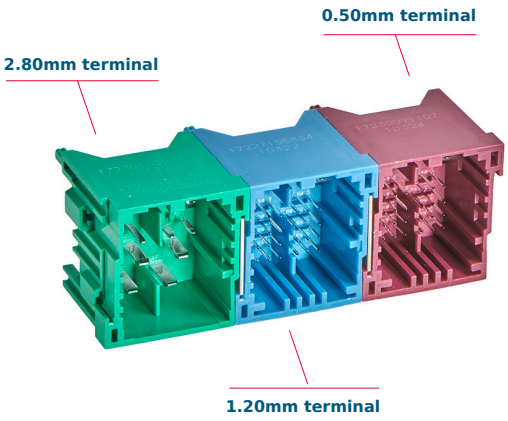
- Higher bandwidth
- Lower cost, as the unshielded single-pair twisted wire for BroadR-Reach doesn't need aluminum foil and insulating compound layers
- Suitability for the development of new-generation electronic and electrical architecture
- Note: The BCM may require a megabit Ethernet communication

STAK50H PRODUCT FEATURES

Mixed Pin Design Meets Current-Carrying Requirements Under All Functional Specifications

StAK50h uses the terminal system that has been widely accepted in the automotive industry and meets the functional requirements for signal transition, medium current as well as large current within 1 connector suite. This achieves standardization for the connector:

- 0.50mm signal pin, 3.0A current-carrying capability
- 1.20mm power pin, 13.0A current-carrying capability
- 2.80mm power pin, 23.0A current-carrying capability

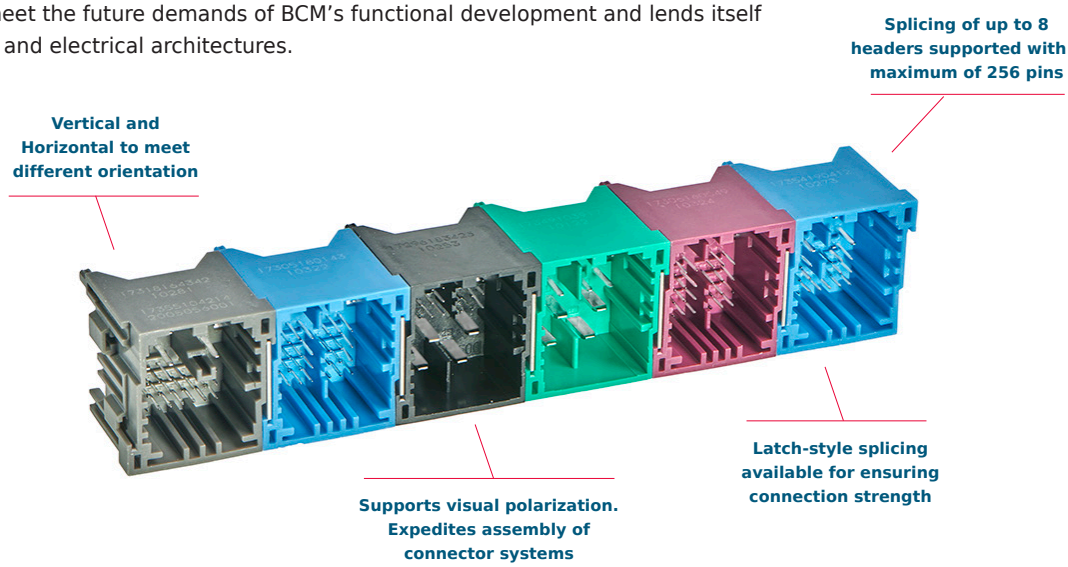


Large-Pin-Count-Combined Connector

Modular splicing design:

- Splicing for up to 8 connectors supported, 256 pins maximum
- Dual polarization options – colored and mechanical
- 5 types of modular single-interface headers for combination from over 100 mixed pins

The connector will meet the future demands of BCM's functional development and lends itself to various electronic and electrical architectures.

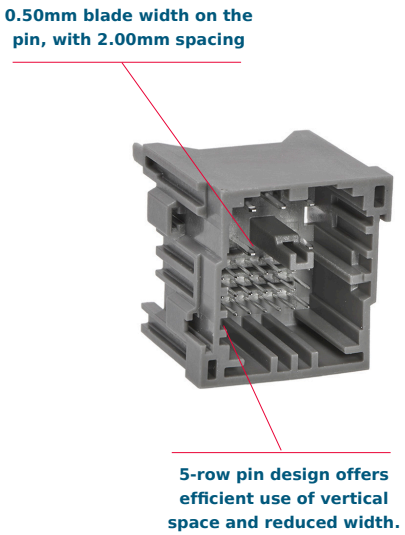


STAK50H PRODUCT FEATURES

One of the Smallest Terminal Systems in the Industry with a Miniaturized Connector

Miniaturized terminal systems with reduced connector size:

- One of the smallest 0.50mm terminal systems in the industry
- 20% smaller than the traditional 0.64mm terminal
- Multi-row pin arrangement with smaller connector width and reduced PCB footprint
- 22.90mm height onboard only for low-profile version

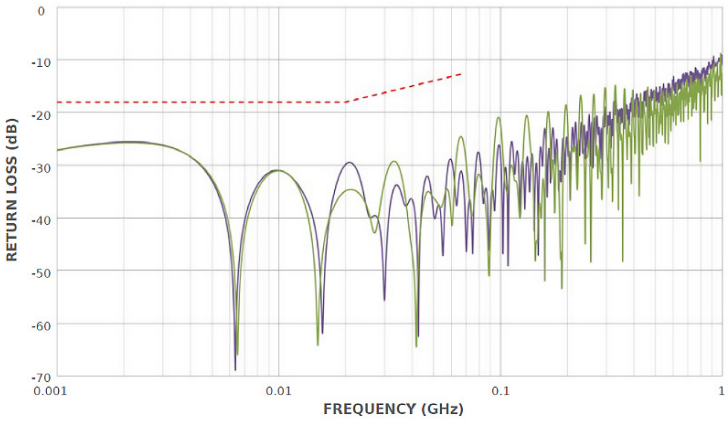


Ergonomic Design With Optional Outgoing Line Directions

- Mating/unmating forces smaller than 75N and meeting the GMW3191 standard with the ergonomic design-facilitating operation
- Horizontal and vertical header options satisfy various demands on outgoing lines during installation
- Optional outlet cover available on harness end connector
- Zoned harness management supported upon splicing for multiple interfaces

100 Mbps Ethernet Supported

- BroadR-Reach (100 Mbps)/IEEE 802.3bw testing passed
- Support for multiple pairs of 100 Mbps signal synchronously on the connector






LIST OF PART NUMBERS						
Connector Pins	**0.50mm Pins**	**1.20mm Pins**	**2.80mm Pins**	Board End Connector Part Numbers		**Harness End Connector Part Numbers**
				Vertical	**Horizontal**	
12	0	8	4	2005010121	2005020121	1600260001
25	21	0	4	2005010251	2005020251	1600270011
27	19	8	0	2005010271	2005020271	1600290011
28	21	7	0	2005010281	2005020281	1600140011
32	28	4	0	2005010321	2005020321	1600280011

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