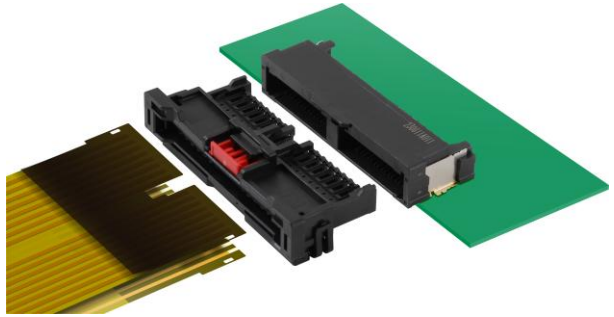


FLEXI-LATCH+ CONNECTORS FOR ELECTRIC VEHICLE (EV) AND BATTERY MANAGEMENT

Design engineers need solutions that simplify the complexity of traditional connectors used for high-impact EV signals, while meeting industry standards and supporting a lightweight system. Enhanced with multiple levels of locking and keying options for secure mating, Flexi-Latch+ Connectors are constructed to withstand the adverse mechanical and thermal conditions of the automotive sector and feature innovative designs that ensure electrical continuity. These robust, compact connectors also seamlessly integrate into power management systems, controllers, and power conversion units across various PCB layouts.

NPI INNOVATION

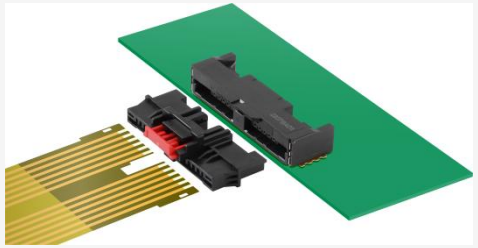
JANUARY 2026

Flexi-Latch+ Connectors for EV and Battery Management

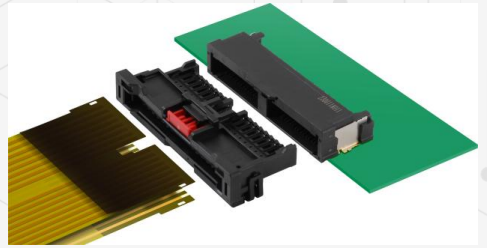
Designed to simplify complexity, meet industry standards and ensure a streamlined assembly process, Flexi-Latch+ Connectors transform high-impact EV signal connectivity. These connectors are built for EV battery management and power control systems; they also align with the latest battery management system technologies and accommodate diverse battery configurations for future expansions. Lightweight, compact and touch proof, these products withstand harsh conditions for long-term reliability. Avoid compromising on performance, efficiency or safety—choose Flexi-Latch+ Connectors to elevate your automotive and commercial vehicle applications.

Key Product Information

Current:	1.0A
Pitch:	1.50mm (single row); 2.00mm (dual row)
Voltage:	250V (1.50mm); 400V (2.00mm) pollution degree 1 IEC 60664-1
Operating Temperatures:	-40 to 105°C



Single-Cable Version



Double-Cable Version

Relay Version for FFC/FPC-to-FFC/FPC

View Product Landing Page

Download Datasheet

Series

219019 **1.50mm Pitch Flexi-Latch+ FPC-to-Board Jacket Assembly, with CPA Lock, 12 Circuits**

225433 **1.50mm Pitch Flexi-Latch+ FPC-to-Board Receptacle, Right-Angle, Surface Mount, 12 Circuits**

Vital Product Information

Flexi-Latch+ Connectors for EV and Battery Management

What makes this product different from the competition's?

The Flexi-Latch+ Connection System is an automotive grade connector system that is assembled with an automation-friendly mechanical insertion process. Replacing the historically complex round wire/cable combinations with a flat wire cable/connector system, these connectors streamline manufacturing environments while maximizing PCB real estate.

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

These connectors are especially designed to reach cells in a battery pack for collecting voltage, sensing temperature and balancing cell functionality. By using compact and lightweight connectors, designers can bring this additional functionality to their designs without adding space and weight. This will allow them to integrate the latest technologies into their design with space-saving benefits. Flexi-Latch+ Connectors are installation friendly to avoid operational inefficiencies, simplifying the installation/assembly process.

What is the Molex advantage?

Molex Flexi-Latch+ Connectors offer the adaptability and resilience necessary for automotive power systems. These connectors are robust, compact and USCAR-2 V2/LV214 S1-compliant connector solutions for exceptional performance in EV systems.

Product Overview

Flexi-Latch+ Connectors for EV and Battery Management

Simplified Manufacturing

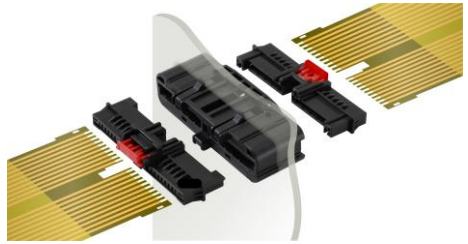
Manufacturing with the Flexi-Latch+ cable-connector combination is a simpler, more streamlined assembly process, whether manual or automated, compared with complicated solder and/or crimping techniques. These more complex methods require specialized manufacturing processes and equipment, using additional components and time.

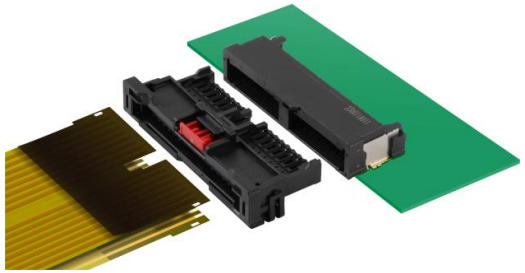
Accurate Mating

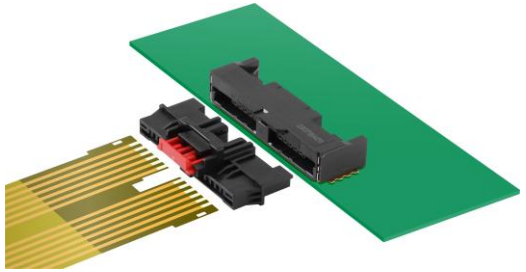
Flexi-Latch+ cable assembly mating is a safe and reliable process that is also automation friendly. For manual assembly or servicing the connector, installers will benefit from touch-safe surfaces and a scoop-proof design, as well as keying and reverse polarity features. The connector also self-locks upon successful insertion, and the connector position assurance (CPA) secondary lock will engage when the connector has been fully mated and locked.

Excellent Reliability

Regardless of shock and vibration, the Flexi-Latch+ connector and cable assembly are retained in the connector with the main lock and the independent secondary lock (ISL, on dual-row connectors only) for long life, as needed by automotive applications. Dual-beam and CPA features also help ensure the signal continuity remains at the highest performance level for reliability.

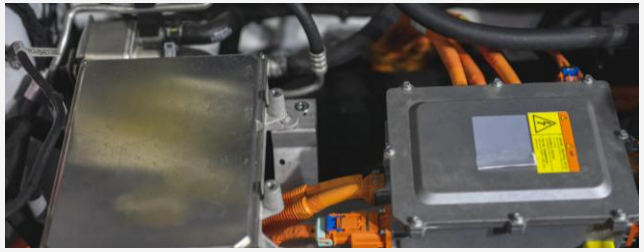






Markets and Applications

Flexi-Latch+ Connectors for EV and Battery Management



Battery Management Systems

ATVs

Data Center/Battery Backup Infrastructure

AUTOMOTIVE

- Battery management systems
  - BEV, PHEV, Hybrid
  - 12V/48V Li-ion batteries (ICE/mild hybrid)
- Electric vehicles
  - Cell sensing units
  - Motor controllers
  - Inverters
  - Power conversions
- E-motorcycles
- Junction boxes

COMMERCIAL VEHICLE

- ATVs
- Forklifts
- Marine: under-dash wiring, lighting
- HD trucks

INDUSTRIAL

- Energy storage systems
- Data center/battery backup infrastructure

Frequently Asked Questions

Flexi-Latch+ Connectors for EV and Battery Management

Is the surface-mount technology (SMT) process different from what is typical in similar board-to-board/flat cable connectors?

The header portion of the connector has SMT terminals and fitting nails as solder elements and this is the connector portion that is soldered to the PCB. The soldering process follows guidelines like those for similar pick-and-place SMT connectors and is clearly spelled out in the product specifications.

How are cables joined to the connector?

The cable manufacturing process is two steps followed by a physical insertion process. On the cable side, the appropriate/matched flat cable (FPC or FFC) is inserted (either by hand or via automation) into the Flexi-Latch+ Plug (plastic connector subcomponent). The cable insertion process is completed when there is an audible “click” and the cable is properly locked/retained.

Optional insertion of an ISL to further lock the cable into the plug:

The header is soldered to the PCB via the SMT process. The final stage of full connection is the final cable assembly insertion. The previously assembled cable-plug assembly is inserted into the previously surface-mounted receptacle and auto-locked in place. To complete the assembly, the CPA lock needs to be slid into place. This connector has design features to help ensure a perfect mate and prevent incorrect connector assembly (e.g., upside-down insertion, partial assembly or locked if not properly inserted).

Solving Industry Challenges

Flexi-Latch+ Connectors for EV and Battery Management

Industry Need	Industry Challenge	Industry Solution	Anticipated Results
Secure connections	In commercial vehicle and automotive industries, it can be difficult to keep connections secure, due to shock and vibration.	**Flexi-Latch+ Connectors** follow USCAR-2/LV214 S1 and are PG19 compliant.	Robust connectors remain securely engaged for reliable connections even in harsh environments.
Compact and lightweight design	Industries are challenged by space constraints in their applications.	**Flexi-Latch+ Connectors** offer a mated height of less than 10.00mm.	Designers can incorporate additional functionality in their design without adding space and weight. This will allow them to integrate the latest technologies into their designs.
Mating reliability	Due to fatigue, sometimes operators improperly engage connectors.	With CPA, polarization and a scoop-proof shape to confirm fitting, **Flexi-Latch+ Connectors** provide excellent mating reliability.	These connectors help prevent accidental connections during assembly so customers will have confidence that their connectors are properly mated.
Streamlined manufacturing process	Need to reduce the complexity of connector systems for high-impact EV signal connectors, especially for mission-critical systems such as battery management	**Flexi-Latch+ Connectors** use compact, lightweight flat connector technologies, to simplify the bill of materials and connector assembly process.	Manufacturers will have faster production with a connector assembly that requires no complex tooling to insert cables into the connector and results in a robust, lightweight and reliable system.

Product Advantages and Features

Flexi-Latch+ Connectors for EV and Battery Management

Simplifies manufacturing process through ease of assembly

Connector is used to insert the FPC into housing, streamlining the overall assembly procedure.

Helps prevent connector mis-mating

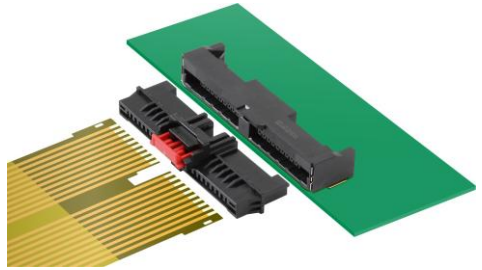
Scoop-proof jacket, mechanical keying and a reverse polarity design contribute to proper mating. Integrated CPAs, polarization and optional ISLs also ensure reliable mating.

Reliable in shock and vibration environments

The connector is USCAR-2 V2/LV214 S1 compliant and PG19 compliant, depending on FPC conditions, for a robust solution.

Protects from impurities and helps prevent moisture cross contamination

An optional silicon wall acts as a barrier to isolate each terminal area.



Cable Assembly Requires No Crimping or Soldering

Key Specifications	
Pitch	1.50mm (single row); 2.00mm (dual row)
Current	1.0A
Voltage (IEC 60664-1 pollution degree 1)	250V (single row) 400V (dual row)
NEMA Rating	IP2xB
Operating Temperatures	-40 to +105°C

Product Advantages and Features

Flexi-Latch+ Connectors for EV and Battery Management

Provides protection with insulation for operator safety

These connectors are IP2xB compliant, inhibiting workers from coming in contact with terminal connections during operations.

Improves contact reliability

Multiple points of contact increase the overall reliability of the connection, as they reduce the chance of dust significantly impacting connectivity.

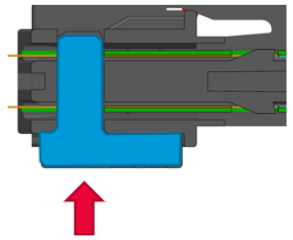
Enhances mating security

For an additional layer of protection, ISL is an option.

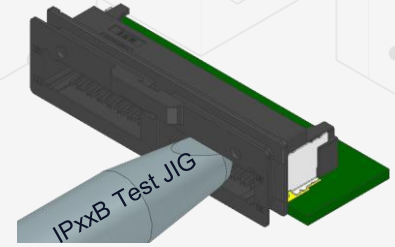
Provides cable locking and visual confirmation of mating

There are inspection windows on the plug/jacket to view for quality control.

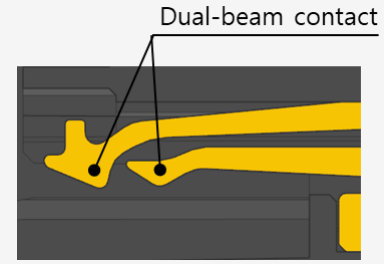
Note: Keying and color keying is available.

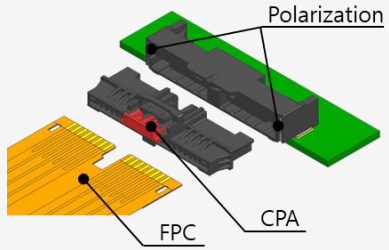


ISL for FPC cables



Touch-Safe Verification





Unique and Useful Differentiation vs. Similar Molex Product

Flexi-Latch+ Connectors for EV and Battery Management

	Molex | Flexi-Latch+ Connectors		Molex | FD19	
	Receptacle	**Plug**	**0.50mm version**	**1.00mm version**
	203389	203390	505110	200528
Pitch and pin count	Single row-1.50mm; dual row-2.00mm 12 to 40 circuits		0.50mm / 1.00mm 4 to 80 circuits	
NEMA Rating	IP2xB		N/A	
Current / Voltage	1.0A 250V (Single Row) (IEC60664-1 pollution degree 1) 400V (Dual Row) (IEC60664-1 pollution degree 1)		0.5A (0.50mm pitch) 1.0A (1.00mm pitch) 48V (Molex standard)	
Operating Temperatures	-40 to +105°C		-40 to +125°C	
Locking	Main connector lock, CPA, optional to lock cable in place		Front-flip lock Notches in cable	
PCB interface / assembly	SMT/hand assembly or automated assembly		SMT/hand assembly or automated assembly	
Keying	Reverse polarity (cable-insert into plug, and plug assembly into Receptacle) Keying/color coding (plug assembly into receptacle)		N/A	
Terminal design	Dual beam terminal		Dual beam terminal	

Unique and Useful Differentiation vs. Competitors' Products

Flexi-Latch+ Connectors for EV and Battery Management

	Molex | Flexi-Latch+ Connectors		Competitor A | Product A		Competitor B | Product B	
Series Number	**Receptacle**	**Plug**	**Receptacle**	**Plug**	**Receptacle**	**Plug**
	203389	203390	-	-	-	-
Pitch and pin count	1.50-single row; 2.00-dual row		1.80-dual row		2.00-single row	
Operation Temperature	-40 to +105°C		- 40 to +105°C		-40 to +125°C	
Rated current	1.0A		3.0A		1.0A	
Rated voltage(V)/ Pollution Degree	250V/1 (IEC 60664-1) 400V/1 (IEC 60664-1)		12/24V		60V	
Size (W x H x D)	40 circuit: 52.2 x 8.94 x 16.75		20 circuit: 27.25 x 16.95 x 24.4		40 circuit: 44.3 x 7.8 x 21.1	

What is the Molex advantage?

Flexi-Latch+ Connectors are robust, compact and reliable with assured locking. Assembly is simpler than crimp terminal connectors. This Flexi-Latch+ connector can be used as connections for FFC's that cannot be supported by connectors with solder contact terminals. These connectors are USCAR-2/LV214 (including PG19)-compliant signal solutions for extreme conditions, ensuring secure, mistake-proof connections in EV systems.

Product Specifications

Flexi-Latch+ Connectors for EV and Battery Management

Dual-Row Specifications	Items	Single-Row Specifications
2.00	Pitch (mm)	1.50
32, 40	Circuit	12, 20, 24
Dual	Row	Single
400V*	Rated Voltage (max.)	250V*
1.0A	Rated Current (max.)	1.0A
-40 to +105°C	Operating Temperatures	-40 to +105°C
1000V	Dielectric Strength	1000V
LV214 S1/USCAR-2 V2	Vibration	LV214 S1/USCAR-2 V2
Top	Lock	Top
w/CPA and ISL	Secondary Lock	w/CPA
4	Polarization	2
Available (Silicon barrier)	Terminal Isolation	None
Gold (Au)	Plating	Gold (Au)
4	Polarization	2
9.44 (mated 10.28)	Height (mm)	7.45 (mated 8.56)
52.20 (40 circuits)	Width (mm)	51.25 (24 circuits)
16.75 (footprint depth: 15.3; mated 25.60)	Depth (mm)	12.02 (footprint depth: 10.52; mated 17.77)

Additional Resources	
Web Overview Page	https://www.molex.com/en-us/products/connectors/ffc-fpc-connectors/flexi-latch-plus
Datasheet	987652-7753.pdf (molex.com)
Global Product Manager	Hiroki Maruoka, MSBU, CSS

*IEC 60664-1 pollution degree 1

creating connections for life

molex