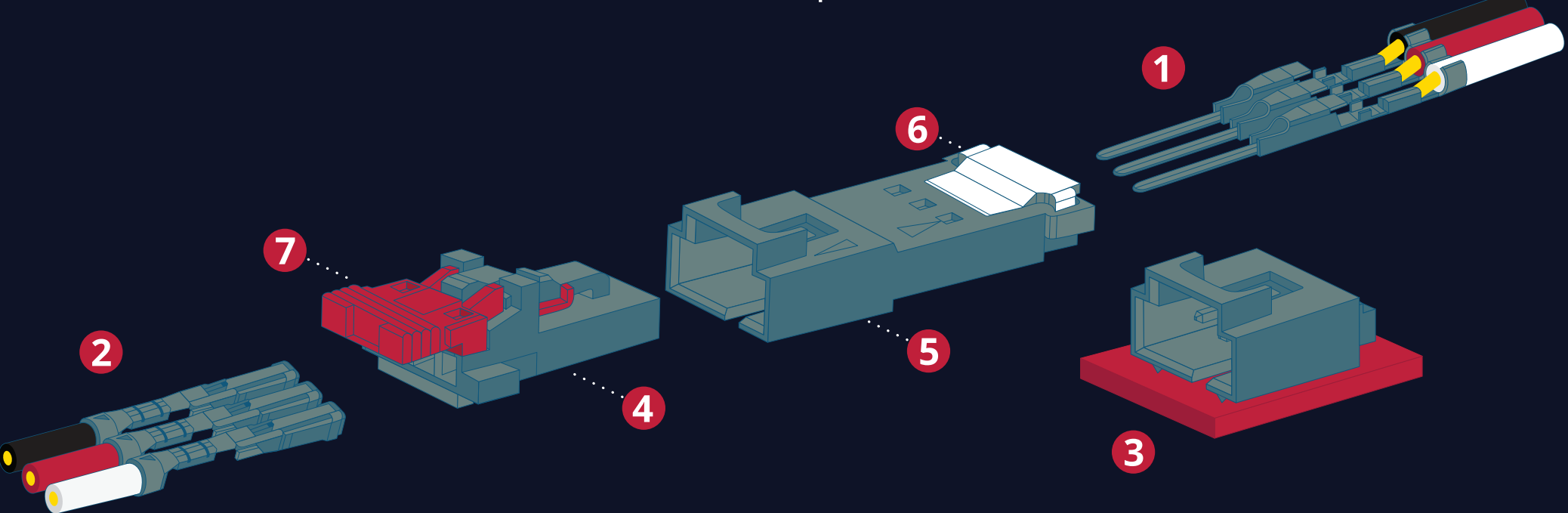


Molex SL Connection System

Guidelines for FIRST Robotics Teams

At Molex, we are dedicated to *Creating Connections for Life*. Our collaborative and customer-centric approach begins with our commitment to the people of Molex and the communities in which we live and work. We are proud to support, supply and sponsor robotics teams like yours worldwide.

To enhance our collaboration, we aim to simplify the process for teams to understand our connectors and build stronger connections. Introducing the Molex SL (Stackable Linear)—a 0.100" pitch, low-profile, latching connection system ideal for signal and low power applications. This guide provides valuable information on terminology, processing and part numbers, enabling you to confidently select the right parts and create high-quality connections that withstand the demands of competition.



Connector Component Terminology

- Blade/Male Terminal** - Metal terminal with a projecting pin or tab
- Socket/Female Terminal** - Metal terminal with a socket receiving space
- Header** - Connector half-soldered to a PCB
- Receptacle Housing** - Connector housing containing female/socket terminals
- Blade/Plug Housing** - Connector housing containing male/blade terminals. Tip: The connector housing type refers to the type of terminal it contains, not the shape of the connector itself.
- Terminal Position Assurance (TPA)** - Secondary component installed after inserting the terminals which ensures the terminals are fully seated. Some TPAs provide additional terminal retention forces. Note: Also called Independent Secondary Lock (ISL)
- Connector Position Assurance (CPA)** - Secondary locking component installed after connector mating which ensures the connector is fully mated and helps prevent accidental disconnection.

Common FRC/FTC Parts List

Part Type	Part Number	Description
Terminals	106020102	SL Female Terminal, 22-24 AWG Wire, Tin Plating, Bag Packaging
	106020103	SL Female Terminal, 22-24 AWG Wire, Gold Plating, Bag Packaging
	106020114	SL Male Terminal, 22-24 AWG Wire, Tin Plating, Bag Packaging
	106020081	SL Male Terminal, 22-24 AWG Wire, Gold Plating, Bag Packaging
Housings	50579402	SL Receptacle Housing with Latch, 2 Circuit, Polarized (Accepts Female Terminal)
	50579403	SL Receptacle Housing with Latch, 3 Circuit, Polarized (Accepts Female Terminal)
	50579404	SL Receptacle Housing with Latch, 4 Circuit, Polarized (Accepts Female Terminal)
	701070001	SL Plug Housing with Latch, 2 Circuit, Polarized (Accepts Male Terminal)
	701070002	SL Plug Housing with Latch, 3 Circuit, Polarized (Accepts Male Terminal)
	701070003	SL Plug Housing with Latch, 4 Circuit, Polarized (Accepts Male Terminal)
	50579003	SL Housing without Latch, 3 Circuit, Non-Polarized (Accepts Male or Female Terminal)
	638118700	Premium Hand Crimp Tool for 22-24 AWG and 32-36 AWG Terminals
Tools	638170000	Hand Wire Stripping Tool for 8-34 AWG Wire, Straight

FAQ

Where should I use the SL connectors?

- SL Connectors are ideal for CAN, PWM, Servo, and low current (<3.0A) applications.

The Molex Hand Tool is expensive. Are there discounts for FIRST teams?

- Yes, Molex provides hand tools to teams through FIRST Choice and other means. Please visit our FIRST portal for more information (see QR code in bottom right).

Should I use TPAs?

- TPAs are optional but recommended for FRC. They ensure fully seated terminals and significantly increase terminal retention from 17.5N to 50N+.

Should I use a CPA?

- CPAs are not typically needed for FIRST applications as the push - click - pull method provides sufficient indication of a fully mated connector and standalone connector to connector retention without a CPA is robust.

Should I use tin or gold plated terminals?

- 0.38µm gold terminal plating is generally recommended as it doubles the rated mating cycles for SL from 25 with tin to 50 with gold. However, tin can still be a suitable option as performance for both plating types will typically maintain adequate FRC/FTC performance far in excess of the rated cycle life.

Does Molex Sponsor Teams?

- Yes, see the Molex FIRST Portal (QR code in bottom right) for details and how to apply.

1

Wire Stripping

Correctly Stripped Wire

Strip Length for SL 22AWG Wire
2.54mm - 3.17mm (0.100in - 0.125in)

Incorrectly Stripped Wire

- Strands not aligned at cut end
- Nicked or cut strands
- Poorly stripped insulation
- Frayed wire strands

2

Terminal Crimping

1. Insert wire into the crimper.
2. Push the handle to crimp the terminal.
3. Release the handle.
4. Push the wire stop to the end of the handle.
5. Pull the handle back to release the wire.
6. The wire is now crimped to the terminal.

3

Crimp Inspection

Good Crimp

Insulation and wire strands must be visible

Wire strands must be visible

Incorrect Crimp

Below is a list of common and impactful crimp issues. Be sure to visually inspect each crimp for these common errors. Note: This list is not exhaustive of all potential crimp failures. Consult the application specification for further information.

Issue:
Crimp seam not closed

Cause:

- Incorrect hand tool cavity
- Incorrect terminal
- Incorrect wire size

Issue:
Wire strands outside of Crimp

Cause:

- Wire not aligned in center of grips
- Wire end frayed
- Terminal not aligned in hand crimper cavity

Issue:
Insulation in conductor grip; no visible conductor strands

Cause:

- Wire strip length too short

Issue:
No insulation between grip

Cause:

- Wire strip length too long

Issue:
Wire brush too long

Cause:

- Wire not push forward to the wire stop

4

Terminal Inspection

1. Select cavity and orient terminal. Orient latch to window. Ensure correct circuit.
2. Push - Click - Pull. Tip: Use a consistent circuit configuration for CAN. Molex recommends CANH (yellow wire) in Circuit 1 (triangle indicator).
3. Check terminal is seated. Latch is seated. Terminal end is visible.
4. TPA Installation (Optional).

5

Connector Mating

1. Push - Click - Pull
2. Install CPA (Optional)
3. Completed Connector

