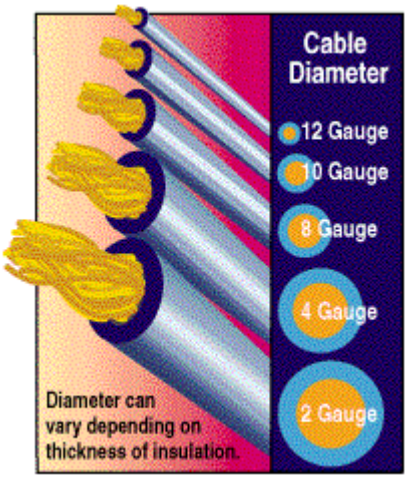
Talkin' Tech:
Electricity-Wiring & Connectors

Paul Crowe once again steps up to bat with a wealth of electrical and ignition expertise to share with the HOOK Readers. This is the second of the three-part series Paul has graciously offered to share, and I extend him a big thank you for his efforts! -BL

-**Wire gauge** is probably the most over looked item when a DIY (do it yourself) owner decides to update accessories. Pay attention to this or suffer nagging issues for years to come. When in doubt go one gauge size larger (smaller number = larger load capacity).



AMPS	3'	5'	7'	10'	15'	20'	25'
0 to 7	18	18	18	18	18	18	18
8	18	18	18	18	18	16	16
10	18	18	18	18	16	16	16
11	18	18	18	18	16	16	14
12	18	18	18	18	16	16	14
15	18	18	18	18	14	14	12
18	18	18	16	16	14	14	12
20	18	18	16	16	14	12	10
22	18	18	16	16	12	12	10
24	18	18	16	16	12	12	10
30	18	16	16	14	10	10	10
40	18	16	14	12	10	10	8
50	16	14	12	12	10	10	8
100	12	12	10	10	6	6	4
150	10	10	8	8	4	4	2
200	10	8	8	6	4	4	2

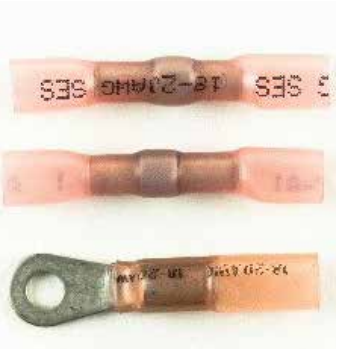
-**Wire covering** is something that is rarely discussed. We use the flexible covering that expands over connectors and then shrinks back down (think Chinese finger torture).

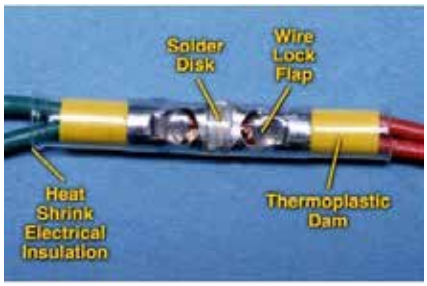
They also offer some that have a slit down them so you can open it up later for repair or adding wires. Most are rated to 500 degrees F heat resistance and the price is reasonable. Sizes range from ¼" up to well over an inch diameter.

-Now let's discuss **three types of connectors**. The cheap hardware store type, the better Type B open barrel style, and the newest Molex/Amphenol water tight connectors seen in modern cars. There is a quality difference that should not be ignored.

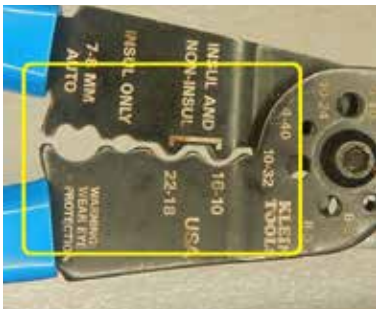
1) Standard closed barrel connector (Insulated or Non-Insulated). Common slang I use is "Smash Connector": These are basic connectors sold in most stores. Low strength connector, no waterproof qualities, metal crimp fractures are common. This is my least favorite connector because most electrical issues I have fixed used these connectors.

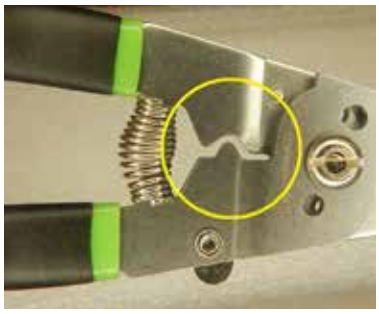
A better option would be connectors found at Fastenal, Grainger, Mouser, or similar electronics supply store. Many have an outer protector that can be heated after crimping. Multilink brand has solder inside that provides OEM quality strength and complete waterproofing.





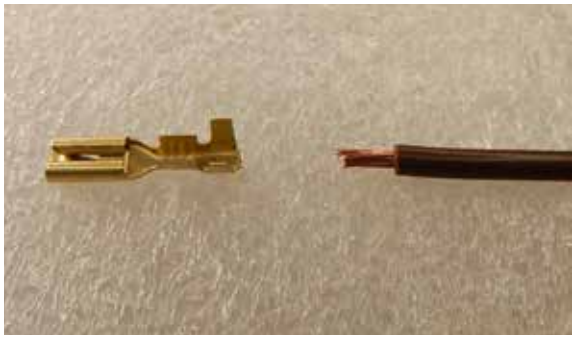
The crimping tool is moon shaped which crushes the connector over the wires. That is one reason why the holding power of these connectors is poor.



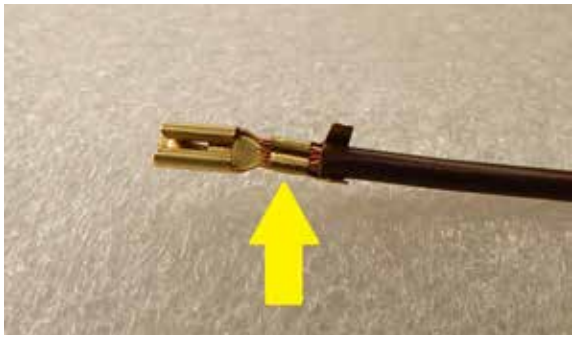


2) **Open barrel or Type B connector** (separate insulator sleeve): Common on Japanese motorcycles, high quality connector sold online or from motorcycle suppliers. Requires a special tool and basic installation knowledge. Medium waterproof properties, usually made of higher quality material depending on supplier (K&L or NAMZ are good quality).

Sequence to crimping an Open Barrel connector:



First strip just enough wire to pass through the first section (about ¼") ; Now carefully crimp the bare wire to secure the connector.



Crimp the second part of the connector, being careful not to damage the outer wire protection.

The insulator should be just sticking past the first crimp. You can solder the connector afterward but never allow the solder to creep past the first crimp or failure is likely.

Closeup of a complete Type B/Open Barrel style connector.

3) **Molex, Amphenol, or Deutsch type connector:** Used in modern automotive applications. Highly waterproof, durable, and expensive. Requires special tools and basic assembly knowledge.

All of the connectors shown above require the wire to be stripped, placed into the terminal correctly, and crimped using an appropriate tool. If you short cut on this step it will haunt you forever, so buy the correct tool.

Soldering: We jokingly ask "what is the quickest way to start an internet fight?"

Answer: Discuss soldering joints, coil resistance, or tractor brands.

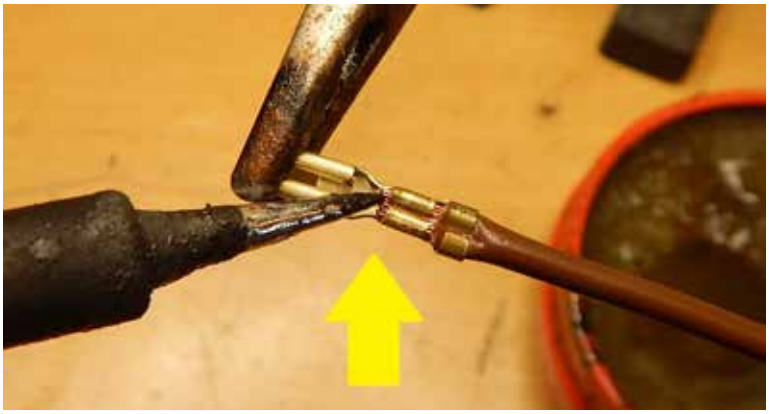
Soldering two parts together is good, bad, and ugly. It helps hold the joint in place but engine vibration often causes failures that a common crimped connection won't have. If soldering is over done it can creep up the wire and under the insulation. When the wire fails you cannot see the break. Finding the failed joint can take days, weeks, or months.

Here is a good rule of thumb:

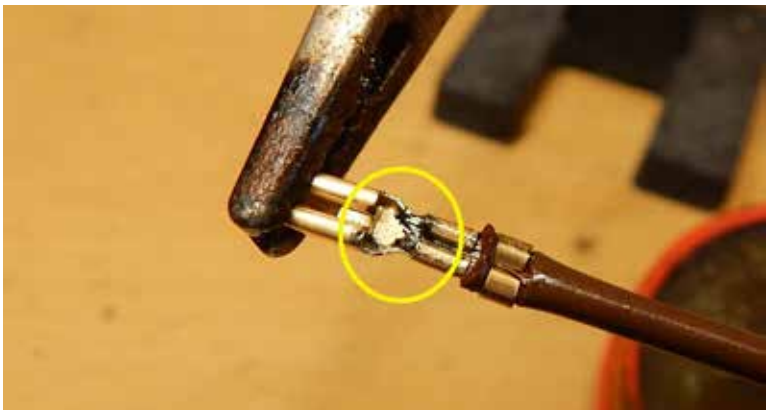
If you use an open barrel with twin crimps t**here is no need to solder.** If you choose to solder the joint NEVER allow the solder to flow past the bare wires!

The correct method is as follows:
-Preheat the soldering iron tip. Dip into the flux so clean it. I also dip the solder wire into flux so it flows nicely into the connection.

-I prefer to dab a small amount of solder onto the tip of the iron. This works particularly well if you are soldering small joints. Heat the connection using the iron so the solder flows INTO the joint. Normally you can see the part become "glossy" and that it the best time to dab the solder into the joint.



-Dab just a bit of solder into the joint using the minimum amount of heat possible. Cold joints won't hold but when soldering electronics you must avoid damaging the part with excessive heat. A properly soldered joint appears glossy.



The next edition will cover loads such as starter motors, fans, ignitions, and waterpumps.