

Using 4 AWG cable with the Anderson SB50 connector

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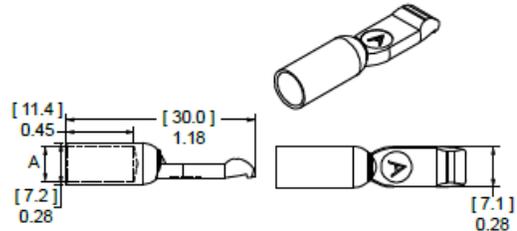
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The crimp contacts used within the Anderson SB50 connector are sized for up to 6 AWG cable.

SB®50 Silver Plated Wire Contacts

Use two silver plated contacts per housing for the best electrical performance and durability up to 10,000 mating cycles. See reducing bushings in accessory section for smaller wires.

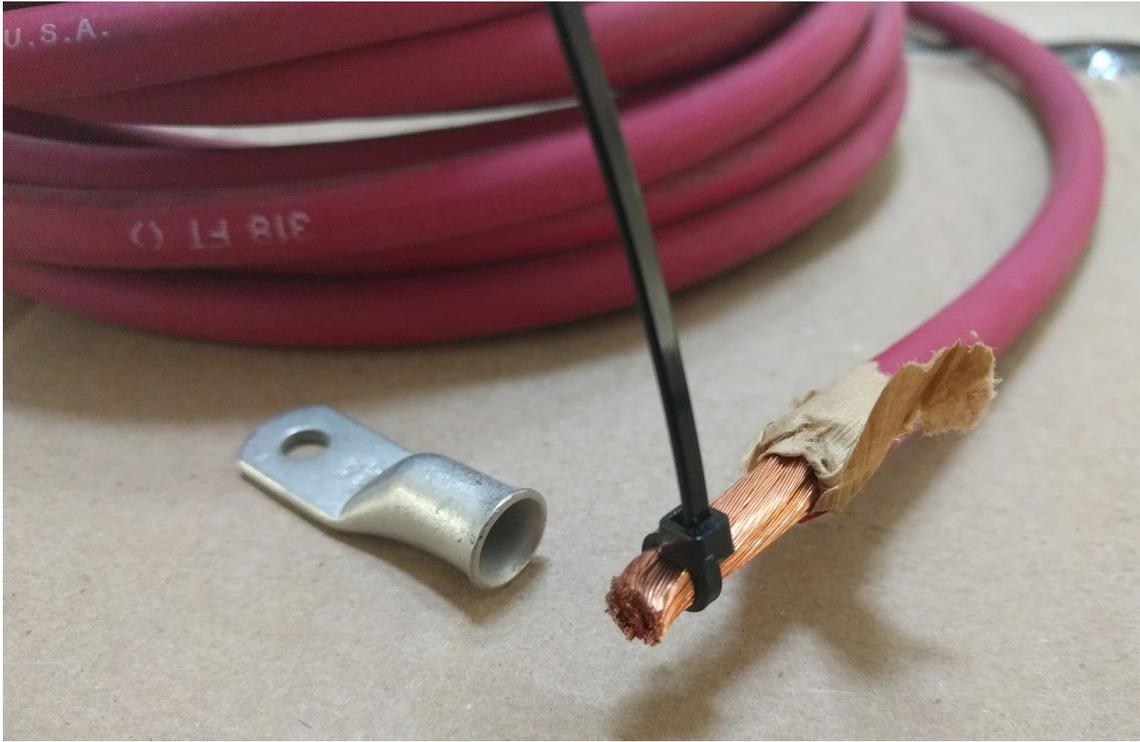
AWG	mm ²	Mating Force	Loose Piece		Dimensions	
			Part Numbers	Part Numbers	inches	mm
Minimum Quantity			1,000	100		
6	13.3	Low	1307-BK 1307		0.22	5.59
6	13.3	High	5900-BK 5900		0.22	5.59
8	8.4	High	5952-Bk 5952		0.19	4.83
12 to 10	3.3 to 5.3	Low	5953-BK 5953		0.14	3.56
12 to 10	3.3 to 5.3	High	5915-BK 5915		0.14	3.56



In this document, we develop and test a method to increase the capacity of this contact to fit 4 AWG welding cable.

The 4 AWG welding cable (<http://www.remybattery.com/4-gauge-welding-cable-red.html>) used in this document has the following specifications:

Parameter	Value	Unit
Vendor	REMY BATTERY	-
Part number	WC4-RED	-
Insulating jacket material	EPDM	-
Strand arrangement	7 x 56/30	-
Insulating jacket OD	0.34	in
Conductor OD	0.235	in



Stripped section of 4 AWG welding cable and an appropriately sized lug

For this cable to work correctly with the SB50 connector, the following criteria must be met:

1. The OD of the cable's insulating jacket must fit within the ID of the SB50 connector housing.

This is met without modification to any component. The ID of the housing is about 0.44 in, much larger than the OD of the insulation.

2. The OD of the conductor must fit within the ID of the crimp contact.

Before modification, the ID of the crimp contact is about 0.224; therefore there is approximately 0.006 of radial interference with the conductor. After modification, the ID of the crimp contact is increased to about 0.250, providing about 0.008 of radial clearance for the conductor.

In comparison, an off-the-shelf lug meant for 4 AWG has an ID of approximately 0.280, which provides about 0.023 of radial clearance for the conductor.

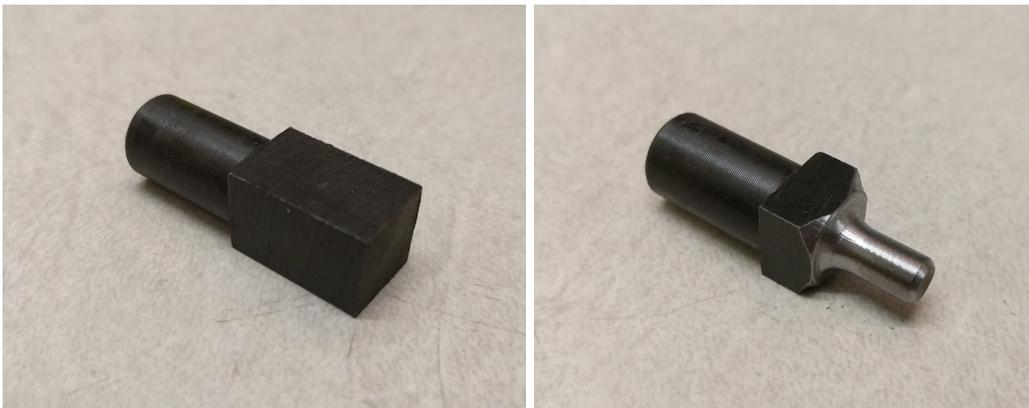
To modify the contact to meet the criteria described above, we design and construct the following devices:

- A fixture to hold the contact
- A swaging tool



Swaging tool and fixture (holding unmodified contact vertically beneath the swaging tool) in a 2-ton arbor press

The swaging tool has an OD of 0.245 in and it has a filleted leading end. It is made from a steel die which was originally supplied with the Palmgren 2-ton arbor press (<https://smile.amazon.com/Palmgren-Arbor-press-2-ton/dp/B00068U7X6>). The tool is inserted into a hole in the end of the ram and is retained in place by a magnet.



Machining of the swaging tool

We tested the swaging operation both with and without the use of lubricant and observed no differences. Since the ID of the swaged contact reaches a final size about 0.005 larger than the OD of the swaging tool, the swaging tool is freely removed from the swaged contact.



Swaged contact removed from the arbor press, but before removal from the fixture

The cable can now be fed into the enlarged contact without needing to trim any of the strands. The contact is crimped with the hydraulic wire crimping tool available from Harbor Freight (<https://www.harborfreight.com/hydraulic-wire-crimping-tool-66150.html>). The 4 AWG dies are used in the crimping tool.



Crimped contact

The assembled cable may now be installed into the SB50 housing.



4 AWG welding cable installed into an Anderson SB50 connector without trimming any strands

The assembled cable was pull-tested to confirm the quality of the crimp. We observed no failure after a tension force exceeding 215 lbf (the author's body weight) was applied to the crimped assembly.



Assembly after pull testing to 215 lbf