

Incident Summary #II-1368066-2022 (#27674) (FINAL)

SUPPORTING INFORMATION	Incident Date	May 1, 2022		
	Location	Mission		
	Regulated industry sector	Electrical - Low voltage electrical system (30V to 750V)		
	Impact	Injury	Qty injuries	0
			Injury description	N/A
		Injury rating	None	
	Damage	Damage description	Arcing causing heat damage to an electric vehicle receptacle located in the homeowners attached garage.	
		Damage rating	Minor	
Incident rating	Minor			
Incident overview	A receptacle in the attached garage of a single-family dwelling, installed for electric vehicle charging, overheated due to arcing causing heat and smoke damage to the receptacle and outlet box.			
INVESTIGATION CONCLUSIONS	Site, system and components	<ul style="list-style-type: none"> • 200-amp 120/240-volt main consumer service • 2 pole 40-amp Siemens circuit breaker protecting a 240-volt 40-amp electric vehicle branch circuit • 3 conductor # 6 AWG aluminum non-metallic-sheathed cable • Nema 14-50R 50-amp 125/250-volt Aluminum/Copper rated receptacle (The manufacturer requires the installer to tighten the screw termination point to a torque setting of 30 IN-LB identified on the receptacle face) • 4 11/16 non-metallic outlet box 		
	Failure scenario(s)	<p>At the time of the initial installation of the receptacle, the installer used 3 conductor #6 AWG aluminum cable for the branch circuit. Due to the aluminum conductor being soft and malleable it is good industry practice for the installer to re-check the torque settings of termination points on the receptacle, to ensure the termination point is torqued to the correct amount. The wire may have altered due to the soft and malleable characteristics.</p> <p>A connection point was loose on one of the line terminals and over time this loose connection point created a high impedance arcing condition while in use. The high temperatures due to the arcing caused the plastic components of the receptacle to melt and expose the metal plate the receptacle was mounted on to damage from the heat.</p>		

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Facts and evidence	<p>Evidence was obtained by the Field Safety Representative (FSR) who completed the initial installation and the subsequent replacement of the damaged receptacle and outlet box.</p> <p>The Electrical Safety Officer (ESO) met with the FSR for an interview and to examine the damaged electrical equipment for investigation purposes. During examination of the electrical equipment, a loose termination point was identified. The Installer was unsure if the torque settings of the termination points on the receptacle were checked at the time of installation.</p>
Causes and contributing factors	<p>The probable cause of the damage to the receptacle was due to the termination of the aluminum conductor to the receptacle not being torqued to the right setting.</p>

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Image 1 - Line termination point where loose connection was found.

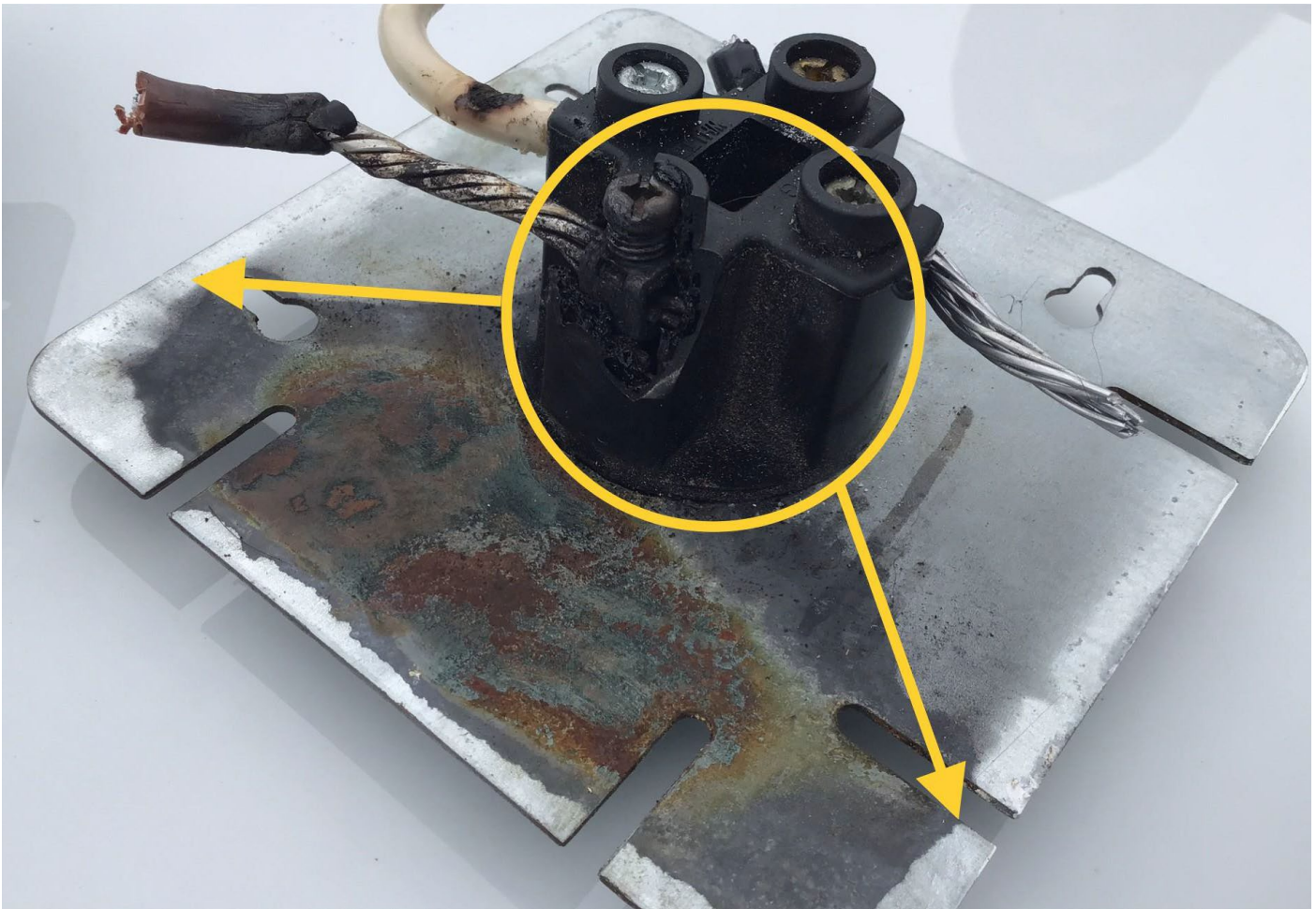


Image 2 - Damage to receptacle showing origin of the arcing and subsequent heat pattern moving outward.



Image 3 - Manufacturer's specifications regarding; wire type, wire size and torque settings for installation.