

## Incident Summary #II-1592365-2023 (#37652) (FINAL)

SUPPORTING INFORMATION	Incident Date	August 15, 2023	
	Location	Port Coquitlam	
	Regulated industry sector	Electrical - Low voltage electrical system (30V to 750V)	
	Impact	Qty injuries	0
		Injury description	N/A
		Injury rating	None
	Damage	Damage description	Damage to the branch circuit conductors and smoke alarm outlet box resulting in a burning smell and smoke within the single-family dwelling.
		Damage rating	Minor
Incident rating	Minor		
Incident overview	The fire department was called to respond to this site on two separate occasions after the homeowner reported a burning smell coming from the top floor hallway smoke alarm. In both cases, the fire department attended, observing evidence of the electrical system shorting in the top floor smoke alarm outlet box causing charring of the branch circuit conductor insulation and the smoke alarm outlet box.		
INVESTIGATION CONCLUSIONS	Site, system and components	<p>The area was experiencing above seasonal temperatures (heat wave) at the time of the incident. A portable air conditioner was plugged into the same branch circuit as the smoke alarm.</p> <p>General use 2-Wire 15Amp branch circuits in a single-family dwelling are allowed to have 12 outlets. Large portable air conditioners require a dedicated circuit, so they do not overload circuits with multiple outlets and other loads.</p> <p>The portable air conditioner noted “Use on single outlet circuit only”, and an ampacity of 11.9Amp on the nameplate located on the side of the unit was plugged into a receptacle located in the top floor main bedroom.</p> <p>Over time, electrical connections can become loose leading to resistance in the connections and overheating. The splice in this case was a crimped connection covered with electrical tape. Higher ampacity running through the branch circuit can make the issue worse. Connections may be loose or become loose if not installed properly at the time of initial installation, alternations to the circuit, incompatible wire connectors, vibrations and overloading of the circuit causing expansion and contraction due to heating and cooling of the connection.</p>	

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<p>Failure scenario(s)</p>	<p>The area where the incident occurred was experiencing higher than normal temperatures. The homeowner plugged in a portable air conditioner rated at 11.9Amp into a general use 15Amp receptacle located in the main top floor bedroom that was not on a dedicated circuit. Due to the high temperature the portable air conditioner was in constant use to provide relief from the heat throughout the top floor of the home. The homeowner indicated there was a burning smell coming from the top floor hallway smoke alarm and called the fire department. It was identified that the branch circuit connections in the smoke alarm outlet box may not have been made up tight at the time of installation or may have become loose overtime and were on the same branch circuit as the receptacle the portable air conditioner was plugged into. The branch circuit was possibly overloaded while the portable air conditioner was in use.</p>
<p>Facts and evidence</p>	<ul style="list-style-type: none"> <li>• The homeowner stated there was smoke and a burning smell coming from the top floor smoke alarm.</li> <li>• The homeowner stated they had been using portable air conditioners on the top floor due to the heat. One of the portable air conditioners was plugged into the same branch circuit as the smoke detector which also include receptacles and lights on the top floor and top floor main bedroom.</li> <li>• Large portable air conditioners are usually required to be on dedicated circuits. The air conditioner used by the homeowner indicated for use on a single outlet circuit (<a href="#">Image 5</a>).</li> <li>• Images of the smoke alarm box and red-hot electrical connection were provided to the Safety Officer (<a href="#">Image 1</a>, <a href="#">Image 2</a> and <a href="#">Image 4</a>).</li> <li>• Removed damaged conductors were left on-site for the Safety Officer review; the removed conductors had some insulation melted off and were spliced using a crimped connection and covered with electrical tape (<a href="#">Image 3</a>).</li> <li>• Fire department was called to the scene twice by the homeowner due to smoke and burning smell.</li> </ul>
<p>Causes and contributing factors</p>	<p>It is probable that the incident was caused by a loose branch circuit conductor connection in the smoke alarm outlet box, possibly made worse by a high wattage portable air conditioner running for a prolonged period of time, during the heat wave which may have contributed to overloading of the branch circuit.</p>

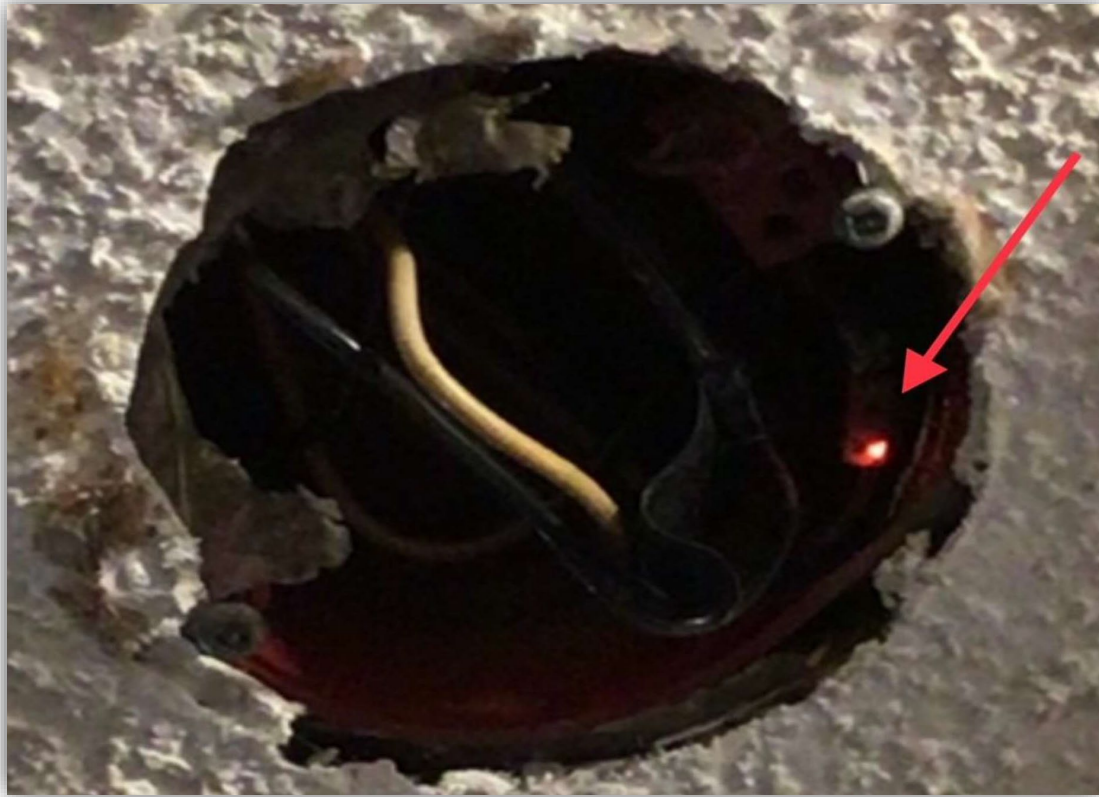


Image 1 - The red-hot branch circuit neutral conductor splice (crimped connection) at the time of the incident within the smoke alarm box (*Image provided by homeowner*).



Image 2 - Box after the power to the circuit was turned off (*Image provided by homeowner*).

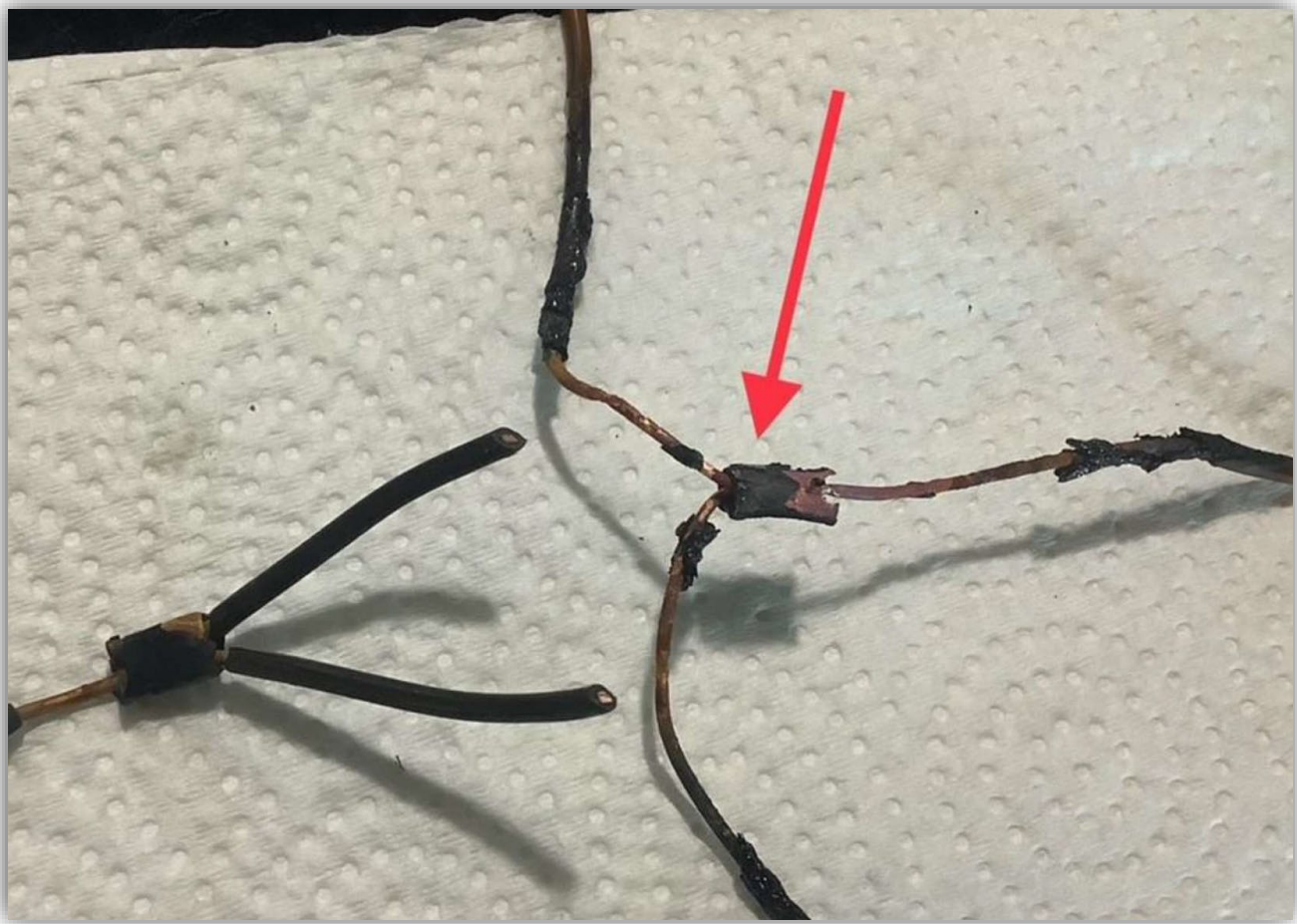


Image 3 - Damaged to the removed conductors. [RED] The crimped electrical connection that was red-hot in [Image 1](#).



Image 4 - Damage to the smoke alarm outlet box.

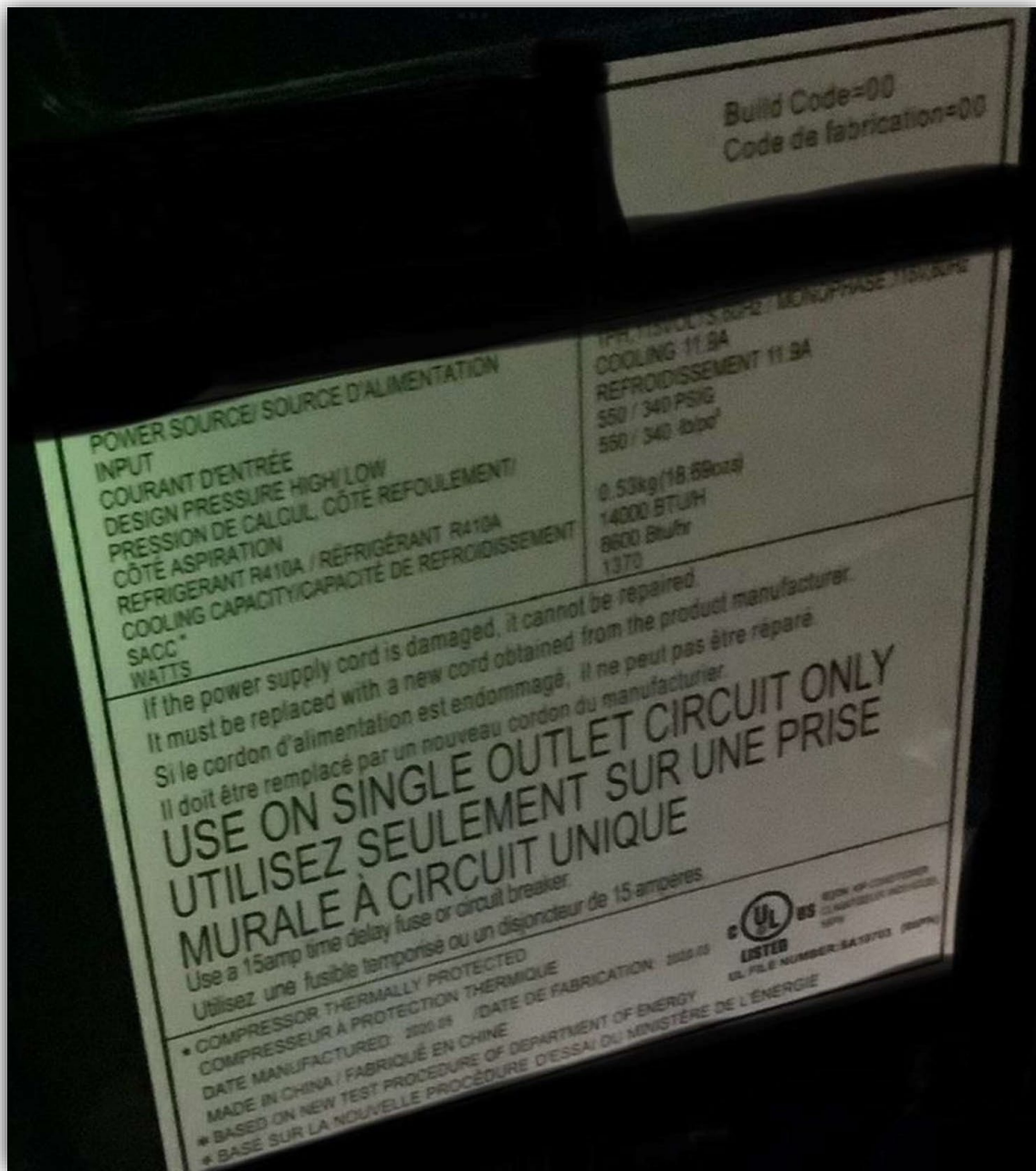


Image 5 - Nameplate located on the side of the portable air conditioner.