

# Services Guide

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## Electric Contractors

*\*NOTE 1: This information is pulled from credible sources. This information is a guide. Any information used from this guide must be re-contextualized (no copying and pasting). Re-contextualize information incorporating SEO and business specifics.*

*\*NOTE 2: For MCP websites, stick to general information and avoid specifics.*

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# 1. ELECTRIC CONTRACTORS OVERVIEW

[https://en.wikipedia.org/wiki/Electrical\\_contractor](https://en.wikipedia.org/wiki/Electrical_contractor)

<https://en.wikipedia.org/wiki/Electrician#Canada>

<http://www.ceca.org/licensing/index.asp>

<http://www.sustainablebusinessstoolkit.com/hire-residential-electrical-contractor/>

## 1.1 GENERAL INFORMATION

- An electrical contractor is a business person or firm that specializes in construction work related to design, installation, and maintenance of electrical systems
- An electrical contractor is different from an electrician; an electrician is an individual tradesman, while an electrical contractor refers to the business person or company that employs electricians
- Becoming an electrician requires four to five years of schooling to become a full journeyman
- A licensed electrician is required to have 9000 hours of on-the-job training
- Electrical contractor licensing varies between provinces, but generally all require at least the title of master electrician or equivalent
- In British Columbia, one can go a step beyond master and become a field safety representative (FSR); this is required to become a licensed electrical contractor

## 1.2 SEO

### Keywords (First Row – BEST, Last Row – LEAST)

○ Electrician	○ Home electrician	○ Industrial electrician	○ Lightning protection
○ Electrical contractor	○ Commercial electrician	○ Indoor lighting	○ Electrical wiring
○ Electric repair	○ Licensed electrician	○ Outdoor lighting	○ Breaker panel service
○ Electrical services	○ Certified electrician	○ Electrical installation	○ Emergency electrician

### 1.3 WHY YOU SHOULD CALL AN ELECTRICAL CONTRACTOR

- Electricity is ubiquitous in our modern society, yet it can be very dangerous to someone inexperienced and careless
- Calling a professional contractor who knows what they're doing is the safest solution and they can get the job done faster
- A contractor can spot and fix code violations with much more ease than you can
- Code violations in your house can make it difficult or impossible to sell your home, and you may also be denied permits for major renovation projects
- Commercial and industrial buildings are held to strict compliance standards for electrical wiring and power schemes, and you may be shut down if you are found in violation of codes
- New wiring should be done with proper quality and safety
- Having proper power schemes can be more efficient and can save you money in the long run
- In the event of damage from storms, fire, or anything else, a contractor can help you understand the extent of the damage and help you restore power as quickly as possible

## 2. RESIDENTIAL ELECTRICAL

### 2.1 SERVICES

<http://mrelectric.com/electrical-services>

<http://www.expertelectric.ca/residential-electrical-services/>

Services	Description
<b>1. Service Panel Upgrades</b>	<ul style="list-style-type: none"><li>○ Service panels break up the power supply coming into your home down to branch circuits</li><li>○ Old panels have limited space to add new circuits</li><li>○ Old panels may even have fuses, which are less than optimal for modern usage</li><li>○ Some insurances carriers will not insure property that has fuses</li><li>○ Upgrades are recommended to keep your panel able to handle increased demand</li><li>○ Overloaded old circuits and fuses are a fire hazard</li></ul>
<b>2. Telephone/Data Lines</b>	<ul style="list-style-type: none"><li>○ Deliver telephone/data cables to any location in the house</li><li>○ Wireless signals are not as strong or as reliable as a wired network signal</li><li>○ Corded phones still work when power is lost and are good to have in emergencies</li></ul>

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<b>3. Power Surge Protectors</b>	<ul style="list-style-type: none"><li>○ Power surges can damage your appliances</li><li>○ Can be caused by lightning, high powered electrical devices, faulty wiring, or even problems with the utility company's equipment</li><li>○ Works by pulling current from outlet and passing it through all electrical devices plugged into the protector</li></ul>
<b>4. Ground Fault Interrupt Circuits</b>	<ul style="list-style-type: none"><li>○ Required in areas with moisture such as washrooms, kitchens, pool areas, etc.</li><li>○ Monitors input and output levels passing through the outlet</li><li>○ If there is any difference between the hot and neutral outlets, the device will cut off power to the outlet to prevent damage or injury</li><li>○ Can detect changes in current as minor as a few milliamps</li></ul>
<b>5. Indoor Lighting</b>	<ul style="list-style-type: none"><li>○ Track and accent lighting</li><li>○ Recessed lighting</li><li>○ Retrofit lighting</li><li>○ Bathroom and kitchen lighting</li><li>○ Used to accent and enhance the feeling of your home</li><li>○ Different lighting causes different effects</li><li>○ What kind of lighting you get depends on the style of your home or even what the room is meant for</li><li>○ LEDs for more energy efficiency</li><li>○ Automation and dimmer switch installation</li></ul>
<b>6. Outdoor Lighting</b>	<ul style="list-style-type: none"><li>○ Can be a deterrent to criminals and crime</li><li>○ Allows you to move more safely on your own property</li><li>○ Need to be installed in the right spots for maximum coverage and to avoid blinding you</li><li>○ Automatic control systems can save on electricity (timers, photoelectric cells, motion detectors)</li><li>○ Timers are least expensive, but will need seasonal adjustment</li><li>○ Photoelectric cells sense lack of natural light to turn on</li><li>○ Motion sensors are best for safety lighting on places like the front steps</li></ul>
<b>7. Code Corrections/Inspections</b>	<ul style="list-style-type: none"><li>○ Electrical code is important to keep up to date</li><li>○ Code compliance can be required for renovating or selling your home</li><li>○ Codes are in place for safety of the home</li><li>○ Rewiring old homes to bring them up to date</li></ul>
<b>8. Wiring</b>	<ul style="list-style-type: none"><li>○ Wiring for new home construction</li><li>○ Can be easy to do wrong</li><li>○ Make sure the house gets the power to the places it needs</li></ul>

	<ul style="list-style-type: none"><li>○ Wiring cleanup</li></ul>
<b>9. Home Entertainment</b>	<ul style="list-style-type: none"><li>○ Multi-room audio systems</li><li>○ Get audio playing in any room of your house</li><li>○ Have music playing in any room of your house</li></ul>
<b>10. General safety</b>	<ul style="list-style-type: none"><li>○ Child-proof outlets</li><li>○ Keep your children from sticking things in outlets</li><li>○ Ground Fault Circuit Interrupters</li><li>○ GFCI are required in areas with high moisture such as bathrooms, kitchens, garages, home exteriors, spa and pool areas, crawlspaces and unfinished basements, wetbars, and laundry sinks</li><li>○ Protect yourself and your family against electrical burns and shocks</li><li>○ Circuit breaker replacements</li></ul>

## **3. COMMERCIAL ELECTRICAL**

### **3.1 SERVICES**

<http://www.mustangcontracting.ca/services.php>

<http://www.fittererelectric.com/services/commercial-electrical-installation>

#### **Commercial buildings such as:**

- Warehouses
- Hotels
- Restaurants
- Steel buildings
- Medical offices
- Offices
- Retail spaces and storefronts
- Marinas

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### Services Under Commercial Electrical:

<http://www.expertelectric.ca/commercial-electrical-services/>  
<http://networkelectric.ca/portfolio-view/commercial-electrical-services>

Service/Product	Description
<b>Outdoor/Parking Lighting</b>	<ul style="list-style-type: none"><li>○ Holiday lighting</li><li>○ Landscape lighting</li><li>○ Outdoor lights on the side of building</li><li>○ Lights in parking lot area</li><li>○ Can increase security outside your building</li><li>○ Guests have an easier time seeing their way around at night</li><li>○ Makes your building more visible</li></ul>
<b>Indoor Lighting</b>	<ul style="list-style-type: none"><li>○ Better visibility in your building</li><li>○ Employees/guests can see properly</li><li>○ Appropriate homier-feeling lighting for restaurants, hotels, or other hospitality buildings</li><li>○ Mood lighting for bars/clubs etc.</li><li>○ Track and accent lighting</li><li>○ Recessed lighting</li><li>○ Retrofit lighting</li></ul>
<b>Transformers</b>	<ul style="list-style-type: none"><li>○ Transfers electrical energy between two or more circuits through electromagnetic induction</li><li>○ Increase or decrease voltage in alternating current within the network</li><li>○ Much more efficient</li><li>○ More than meets the eye</li></ul>
<b>Data/voice Installation</b>	<ul style="list-style-type: none"><li>○ Cat 5/cat 5+/cat 6 cabling</li><li>○ New builds or renovations</li><li>○ Used for telephone or computer signals</li></ul>
<b>Panel Upgrades</b>	<ul style="list-style-type: none"><li>○ Service panels break up the power supply coming into your home down to branch circuits</li><li>○ Old panels have limited space to add new circuits</li><li>○ Old panels may even have fuses</li><li>○ Some insurances carriers will not insure property that has fuses</li><li>○ Upgrades are recommended to keep your panel able to handle increased demand</li><li>○ Overloaded old circuits and fuses are a fire hazard</li></ul>

<b>Fire Alarm</b>	<ul style="list-style-type: none"><li>○ Verification and testing</li><li>○ Troubleshooting</li><li>○ Fire alarms let you know if your building is on fire and that you should evacuate for safety</li><li>○ Should be routinely inspected and maintained for proper safety</li></ul>
<b>Motor Wiring</b>	<ul style="list-style-type: none"><li>○ Control wiring</li><li>○ Variable frequency drives</li><li>○ Soft starts</li><li>○ Start/stop stations</li><li>○ Commercial and industrial motors can be vital to making an enterprise run smoothly</li><li>○ Repairing it yourself can result in you damaging it more</li></ul>

## 4. INDUSTRIAL AND INSTITUTIONAL ELECTRICAL

<http://www.delporthelectric.calls.net/en/commercial-and-industrial-services.html>

<http://spectrumelectric.ca/services.php#industrial>

<http://www.blackandmcdonald.com/>

[https://en.wikipedia.org/wiki/Programmable\\_logic\\_controller](https://en.wikipedia.org/wiki/Programmable_logic_controller)

[https://en.wikipedia.org/wiki/Variable-frequency\\_drive](https://en.wikipedia.org/wiki/Variable-frequency_drive)

<http://www.pducables.com/documents/InfraredScanningElectricalPanels.pdf>

### 4.1 INDUSTRIAL

When dealing with heavy industrial equipment, electrical failures can be costly. Industrial contractors have the experience to install, maintain, and service industrial electrical systems. Initial wiring and installation of mechanical and computer components will be done, and upgrades and relocations, or automations.

Industrial electrical covers the following things:

- Mining Operations
- Oil & Gas
- Manufacturing
- Warehouse
- Automotive
- Forestry



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Services	Description
<ul style="list-style-type: none"><li>• Installation and maintenance</li></ul>	<ul style="list-style-type: none"><li>○ Heavy machinery installation and wiring</li><li>○ New constructions</li><li>○ Expansions</li><li>○ Relocations</li><li>○ Automations</li><li>○ Maintenance for machinery to keep it working properly and safely</li><li>○ Programmable Logic Controllers</li><li>○ Variable frequency drives</li></ul>
<ul style="list-style-type: none"><li>• Infrared scans</li></ul>	<ul style="list-style-type: none"><li>○ Used to detect potential failures in infrastructure</li><li>○ Identify any number of possible electrical problems in and around the data centre</li><li>○ Allows maintenance personnel to take corrective action before a component fails</li><li>○ Reducing repair costs</li><li>○ Should be done on a routine basis</li></ul>
<ul style="list-style-type: none"><li>• Programmable Logic Controller (PLC)</li></ul>	<ul style="list-style-type: none"><li>○ Digital computer used for automation in industrial electromechanical processes</li><li>○ Control of machinery on assembly lines, amusement ride, or light fixtures</li></ul>
<ul style="list-style-type: none"><li>• Variable frequency drives</li></ul>	<ul style="list-style-type: none"><li>○ An adjustable-speed drive used in electro-mechanical drive systems</li><li>○ Used in anything from small appliances to large mine mill drives and compressors</li></ul>

## 4.2 INSTITUTIONAL

<http://www.kbelectriccompany.com/institutional.html>

Institutional locations and audiences require significant amounts of stable, reliable, and consistent power. Often, this means unique construction and maintenance demands for lighting, wiring, and distribution in order for the facility to maintain a proper day-to-day function.

The following places count as institutions for the sake of electrical contracting:

- Schools
- Colleges and universities
- Hospitals
- Medical complexes

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- Healthcare facilities
- Retirement homes
- Daycare facilities
- Military training bases
- Law Courts
- Legislative buildings
- Prisons
- Places of worship
- Police stations

Services	Description
<ul style="list-style-type: none"> <li>● Wiring</li> </ul>	<ul style="list-style-type: none"> <li>○ Initial wiring for a new constructions, remodels, and additions</li> <li>○ Wiring for upgrades, renovations, and conversions</li> <li>○ Above ground or underground</li> <li>○ High and low voltage</li> </ul>
<ul style="list-style-type: none"> <li>● Power distribution</li> </ul>	<ul style="list-style-type: none"> <li>○ Electrical panels</li> <li>○ Electrical switchboards</li> </ul>
<ul style="list-style-type: none"> <li>● Lighting</li> </ul>	<ul style="list-style-type: none"> <li>○ Interior, exterior, and parking lot lighting</li> <li>○ Installation</li> <li>○ Maintenance</li> <li>○ Retrofits and controls</li> <li>○ Emergency lighting in the case power goes down and there are still people within the facility</li> </ul>
<ul style="list-style-type: none"> <li>● Maintenance and service work</li> </ul>	<ul style="list-style-type: none"> <li>○ Preventative maintenance keeps important systems functioning properly</li> <li>○ Proper upkeep of electrical systems keeps them working properly and prevents them from breaking down at crucial intervals</li> <li>○ This is especially important for critical systems such as hospitals, prisons, healthcare facilities, and other places of care</li> <li>○ Any damage to the system should be reported immediately</li> </ul>
<ul style="list-style-type: none"> <li>● Backup power system</li> </ul>	<ul style="list-style-type: none"> <li>○ Vital to ensure continued operation of the facility even in the event of an outage with the normal grid</li> <li>○ Requires regular maintenance so it will work properly when called upon</li> </ul>

## **5. LIGHTNING PROTECTION SYSTEM**

[http://lightningsafety.com/nlsi\\_lhm/lpts.html](http://lightningsafety.com/nlsi_lhm/lpts.html)

<http://www.dobbynelectric.com/lightning-protection>

<http://www.tlpinc.com/lightning-safety/faq-old-wives-tales.html>

### **5.1 GENERAL INFORMATION**

- Quality is crucial
- Not a do-it-yourself project
- Lightning bolts have an average temperature of 15,000°C and can reach temperatures in excess of 27,000°C (for comparison, the surface of the sun is 6,000°C)
- A typical lightning bolt carries a current of 1,000 to 300,000 amps and is rated up to 125 million volts of electricity
- Lightning-related insurance claims in Canada cost \$1.3 million dollars in 2015 alone
- Lightning is estimated to cause almost 4000 forest fires between June and August, resulting in hundreds of millions of dollars in property damage (eg. Fort McMurray)
- People aged 15-34 account for nearly half of all lightning strike victims
- 85% of lightning fatalities are men
- About one-third of lightning injuries occur indoors
- Lightning can strike the ground more than 15km away from an approaching storm

### **5.2 GENERAL BENEFITS**

- A well-maintained lightning rod based protection system significantly decreases lightning damage to a building
- Intercepts the lightning strike and re-directs it to the ground without any impact to the structure, its occupants, or contents
- Protect yourself from potentially fatal strikes
- Don't let harm come to your property
- A lightning protection system can help you avoid higher insurance deductibles

### **5.3 NETWORK COMPONENTS**

A lightning protection network that meets safety standards includes the following elements:

Components	Description
<b>1. Strike termination network</b>	<ul style="list-style-type: none"><li>○ Air terminals or lightning rods</li><li>○ Utility industry uses overhead shielding wire</li></ul>
<b>2. Down-conductor network</b>	<ul style="list-style-type: none"><li>○ Should be installed in a known route outside the structure</li><li>○ Should not be painted</li><li>○ Gradual bends should be adopted to avoid arc flash explosions</li></ul>
<b>3. Grounding electrode network</b>	<ul style="list-style-type: none"><li>○ Single-point grounding system: all elements are connected to a master bus bar which is connected to the external grounding system at only one point</li></ul>
<b>4. Equipotential bonding network</b>	<ul style="list-style-type: none"><li>○ Makes sure all metal masses are at the same electrical potential</li><li>○ Should be integrated with all metallic conductors entering the structure (gas, AC power, water, etc)</li></ul>
<b>5. Surge protection devices</b>	<ul style="list-style-type: none"><li>○ For incoming power, data, and communication lines</li><li>○ Ordinary fuses are not capable of dealing with lightning-induced transients</li><li>○ Protect the main panel entry</li><li>○ Protect all secondary distribution panels</li><li>○ Protect all valuable plug-in devices</li></ul>

## **5.4 INSPECTION AND MAINTENANCE STANDARDS**

- CSA (Canadian Standards Association) and NFPA (National Fire Protection Agency) standards call for regular inspections to be performed on lightning protection systems
- 3-5 years for most systems, 1-3 for critical systems (hospitals, data centres, etc.) or as structural changes and re-roofing necessitates
- Inspection of air terminals to make sure none are damaged in any way
- Tightening of conductors and components where required
- Checking for loose, damaged, or cut cable connections
- Ensure roof conductors are firm and attached according to industry standards
- Continuity tests and measurement of system resistance and grounding electrodes
- Inspection and testing of surge protection devices
- Confirmation that no part of the system has been weakened by corrosion or vibration
- Risk assessment methodology to determine if additional structure on property are at risk to lightning