

RESIDENTIAL ELECTRICAL INFORMATION



Service

Utility owned equipment does not comply with the definition of service box as per the Canadian Electrical Code. Therefore, a service must be installed. Acceptable service is a combination panel with a main breaker and a barrier with a bond screw from the neutral to the enclosure, or a fusible switch with the neutral bonded to the enclosure. The ground wire from either two ten (10) foot ground rods placed ten (10) feet apart or one ground plate two feet deep or other methods of grounding and shall be ran continuous and attached directly to the neutral bar (not enclosure) in the consumer's service portion of the panel. The service equipment must not be more than ten feet inside the building.

Installing outlets, switches, ceiling fittings, etc.

Plan your needs and the locations for the outlets.

Draw up a list of all the devices you will be putting into your home: appliances, washer, dryer, electric heating system (if this is what you are planning), lamps, water heater, etc. Determine the electrical needs for each room. The layout of your furniture will give you a starting point for selecting the location of some of the outlets.

For interior design purposes, remember it's always better to have more outlets than to use extension cords. Who knows what you may want or need later on, a heat pump, garbage disposal unit, home theatre, air exchange system, etc.

If you are planning on doing this work yourself, make sure the power is off at the breaker box before doing any electrical work. Outlets and switches shall be installed in switch boxes. These are placed between the studs (except the boxes with plates that are nailed to the stud). For duplex switches, join two or more boxes by removing the knock out(s) in each box.

To connect the outlets, loosen the screw terminals. Splice the cable back far enough to allow at least 6 in. (152 mm) of wire to stick out and remove the outer casing on each wire. Remove the insulating sleeve and bare approximately 1 in. (25 mm) of the copper wire. Install the appropriate connector. The connector is a metal piece to which the metal box is screwed. Use a wire nut to fasten the wires. To connect the wires to the outlet, use long-nose pliers to make a loop on the bare end wire to hook clockwise around the terminal screw. Tighten the screw.

Dining Area (which forms part of a kitchen)

Put at least one receptacle on a separate circuit in the area.

Laundry Room and area

Install a separate circuit and include at least one receptacle for the washing machine and another one in a convenient location.

Utility Room or area

Install at least one receptacle on a separate circuit for the utility room.

Install one receptacle in each undeveloped area.

Note: Built in vacuum motors require a receptacle on a separate circuit located adjacent to the unit.

Bathrooms and Washrooms

Install one duplex receptacle, protected by a Class A Ground Fault Circuit Interrupter (GFCI) within 1 m (39 inches) of the wash basin. This GFCI receptacle must be located at least 1 m (39 inches) away from a bathtub or shower stall. Measure this distance between the receptacle and the inside edge of the bathtub or shower without piercing a wall, partition or similar obstacle. Receptacles installed in areas (i.e. Bedrooms) that are not separated from the bathroom by a door, should be protected by a Class A Ground Fault Circuit Interrupter if they are within 3 m of a tub or shower.

Outdoor

Provide at least one receptacle on a separate circuit. Receptacles located on the dwelling, including attached carports and attached garages are to be protected by a ground fault circuit interrupter.

Electric Range

- Provide a 40-amp circuit breaker with a 2-pole common trip.
- Use #8 copper wire (NMD-90).
- Use a 50-amp receptacle rated 125/150 volt (14-50R).

Receptacles (General)

- Install duplex receptacles in the walls of every finished room or area so that no point along the floor line of any usable wall space is more than 1.8 m (6 feet) horizontally from a receptacle. The usable wall space includes a wall space of 900 mm (3 feet) or more in width but doesn't include doorways, windows that extend to the floor, fireplaces or other permanent installations that would limit the use of the wall space.
- Ground all receptacles.

- Connect the receptacles so that the silver terminal screw (or the screw identified as “white”) on the receptacle is connected to the white circuit wire, the brass terminal screw (or the screw identified as “black” or “hot”) on the receptacle is connected to the black (or red) circuit wire.
- Connect only one wire under each terminal screw.

Receptacles (General)

- Arc Fault Circuit Interrupters (AFCI) are required on new circuits feeding receptacles in a dwelling unit, except for kitchen counter, island, and peninsula receptacles, kitchen refrigerator receptacles, bathroom GFCI receptacles, and single receptacles for sump pumps. AFCI protection is also not required for receptacles located in a detached garage.

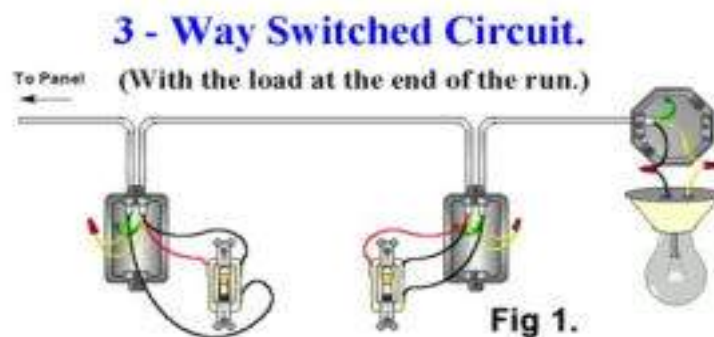
Kitchen Receptacles

- Provide a sufficient number of split receptacles and/or 120-volt, 20-amp receptacles along the wall behind the counter work surface so that no point along the wall line is more than 900 mm (3 feet) from a receptacle outlet measured horizontally along the wall line. Sinks, built-in equipment, and isolated work surfaces less than 300 mm (1 foot) long at the wall line may be excluded from this requirement. Install a minimum of two – 3 wire circuits but no more than two split receptacles on that circuit.
- As an alternative to a 3-wire split receptacle is the use of a 12/2 NMD cable supplied by a 20-amp breaker and connected to a 20-amp, T-slot receptacle.
- All receptacles within 1.5 m of a sink must be protected by a ground fault circuit interruption.
- Refrigerators, dishwashers and microwave ovens require separate circuits.

Stairway Lighting

Three-way switching is required on stairway lighting when a stairway has 4 or more risers and is leading to a finished area or to an outside entrance. Refer to Figure 1 for a simple 3 way switching wiring diagram.

Figure 1



Smoke Alarms

- Install smoke alarms on each floor level, including basements.
- Install smoke alarms in each bedroom as well as 1 located in the common area within 5 m (18 feet) of bedrooms.
- Smoke alarms are to be powered from a branch circuit containing lighting. Smoke alarms are not to be installed on a GFCI or AFCI part of the circuit.
- When more than one smoke detector is being installed, interconnect the smoke detectors with 14/3 NMD-90 cable and connect according to manufacturers instructions.

Note: The Alberta Building Code permits only wired-in smoke alarms (Alberta Building Code Article 9.10.18.3).

Garages

- Provide at least one separate circuit to the garage and one duplex receptacle for each car space. The lighting may come off this circuit.
- Using the same trench for gas sub-service lines and electrical power conductors may be permitted provided there is a minimum separation of 450 mm or 18 inches.
 - Local authority must be consulted (i.e. electrical/gas utility)

Electric Dryer

- Provide a 30-amp circuit breaker with a 2-pole common trip.
- Use #10 copper wire (NMD-90).
- Use a 30-amp receptacle rated 125/250 volt (14-30R).

General Rules for Non-Metallic Sheathed Cables:

1. Use only copper conductors.
2. Use 14 AWG copper wire for general purpose wiring (lights and receptacles).
3. Provide over-current protection of 15 amperes for general purpose wiring (lights and receptacles).
Install a maximum of twelve outlets on a general-purpose circuit (lights and receptacles).
4. Run cable as a loop system in continuous lengths between outlet boxes, junction boxes and panel boxes. Make joints, splices and taps in the outlet boxes.

5. Where cables pass through a hole in a joist or stud, bore the hole 32 mm (1.25 inches) back from the face of the stud or joist or protect the wires from driven nails by using metal plates.
6. Secure wires every 1.5 m (5 feet) when run on the sides of joists or studs and 300 mm (12 inches) from each outlet box.
7. Protect wires that are exposed within 1.5 m (5 feet) of the floor.
8. Keep cables a minimum of 25 mm (1 inch) from heating ducts.
9. Where cables run through or along metallic studs, joists, sheathing or cladding, ensure that the cables are:
10.
 - protected from mechanical damage both during and after installation.
 - protected by an insulation insert secured to the opening in the stud, and,
 - isolated from the stud by an insulating material supported to the member.
11. Protect cables from mechanical damage and from driven nails and screws when they are installed behind baseboards or horizontally behind cupboards.
12. Sub-panels may be added to existing service panel boards provided the main service panel has a main disconnecting device.
13. Where communication cables are to be installed in joists or studs, maintain a minimum separation of 50 mm (2 inches) from any power non-metallic sheath cable.

OUTLET BOXES

1. Set outlet boxes with the finished wall or ceiling and secure them to studs or joists.
2. Ground all outlet boxes.
3. Ensure all junction boxes are accessible after installation.
4. Leave at least 150 mm (6 inches) of wire out of each outlet box for joints and connection of equipment.
5. Surround the outlet boxes with a moisture barrier when the wall or ceiling requires a vapour barrier.

The maximum number of conductors permitted in outlet boxes is:

Light Fixtures

Common Types	Dimensions	Capacity (ml) (cu-in)	#14	General Usage
Octagonal	4 x 1 ½	245 (15)	8	Light or junction
Square	4 x 1 ½	344 (21)	12	Junction
#1103	3 x 2 x 1 ½	131 (8)	3	Switch or plug
#1102	3 x 2 x 2	163 (10)	4	Switch or plug
#1104	3 x 2 x 2 ½	204 (12.5)	5	Switch or plug
#1104	3 x 2 x 3	245 (15)	7	Switch or plug

Note: When a dimmer switch, a timer, or a GFCI receptacle is used in an outlet box, reduce the number of permitted conductors by three.

6. Install three-way switches according to Figure 1.
7. Totally enclosed light fixtures must be installed in clothes closets.